THE

# AMERICAN GAS-LIGHT JOURNAL.

THE OFFICIAL GAZETTE OF

## LIGHT, HEAT, WATER-SUPPLY, AND SEWERAGE.

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### PHOTOGENIC GAS.

The editor of the London *Practical Mechanics' Journal*, thus speaks of Mongruel's new light, or "photogenic gas" as the "inventor" persists in calling it:

"We have ourselves seen such expositions of this light, as were vouchsafed to us in a dark chamber, under Bishopsgate Street, and we bear our most willing testimony to the fact that photogenized coal-gas gives a much better light (especially when the flame is maintained at twice the size) than the coal-gas as it comes from the mains.

"We believe this fact can also be vouched for very universally—if for photogenized, we read the old word naphthalized—seeing that for at least twenty years, the not very recondite fact has been pretty widely known, that the illuminating power of any hydrogen or carburetted hydrogen (coal) gas, poor in carbon, may be considerably increased, by saturating it at its proper temperature and tension, with any hydrocarbon vapor rich in carbon.

"Common spirits of turpentine, or any of the tribe of naphthas, or volatile coal-oils, answer the purpose, worse or better; and at the present moment, there are hundreds of places, in which this expedient is resorted to in one form or another. Amongst the rest, at Greenwich and at Armagh Observatories, the gas is naphthalized by passing it through sponges, or cotton dipped into a volatile hydrocarbon, contained in a small reservoir, *very near* each gas-burner.

The *Photogen* employed by M. Mongruel, we could neither see a sample of, nor get described to us; it was only to be seen, like other miraculous powers, by its effects. If our nose deceive us not, however, it is neither more nor less than rectified naphtha, obtained from some sort of coal or fossil fuel, with a fine name given to it.

"We may just remark in passing that when people venture into classical regions in the manufacture of sounding titles, after the 'Antigropelos style,' it would be well that they knew a little Greek. Photogenic (as the camera gentleman might have hinted to M. Mongruel) does not mean 'Light-creating,' as he fancies apparently, but 'Born of light.' The birth of the present limited liability seems to us to have been in a different region.

"There is nothing patentable in saturating coal-gas with volatile hydrocarbon vapor; and as any one will know who is acquainted with the exact laws of the diffusion and suspension of vapors in permanent gases, so as a large surface of any sort be exposed, it is a matter of profound indifference how the volatile liquid be exposed to the passing stream of gas. There is, therefore, nothing worth £50,000, or as many pence, as we conceive, in the special construction of M. Mongreul's 'cold generator,' which is the only part of the whole affair for which a patent-right could even conceivably be maintained. The real difficulty that has always beset this scheme for making bad gas into a mixture of bad gas and combustible vapor, is this, that sooner or later, and with whatever care, or under whatsoever contrivances or conditions, the hydrocarbon vapor condenses again and is deposited as a liquid in the gas-tubes and fittings, clogging them up, and requiring their being taken asunder and cleaned.

"This was the fatal difficulty that prevented the patent of Count de Valmarino, who was in the field with this invention about twenty years ago, from ever being successful, and, to our own knowledge, it was fairly tried, and upon a large scale, in several parts of Great Britain.

"It is a difficulty that is not even touched by anything that M. Mongreul has proposed or done, nor can it be got rid of by any human contrivance, however much it may be palliated.

"As regards the other feature in M. Mongreul's prospectus, viz., the burning hydrocarbon vapor, carried along by atmospheric air, we need only remark, as a sufficient warning to all, that this is burning an *explosive mixture*, and one of far greater explosive energy than any known fire-damp or mixture of coal-gas and atmospheric air, as may be readily proved. Unless, therefore, the apparatus for burning this mixture be provided with the same contrivances as those by which the gas blow-pipe, &c., in the hands of the chemist, are prevented from exploding, there will always remain the probability of the 'cold generator' generating a serious explosion, and probably succeeding conflagration.

"No such precautions are taken, nor proposed, and the promoters very discreetly pass this point in complete silence. They don't, however, press into the front rank this method of 'burning the atmosphere,' which looks rather like a misgiving."

### DEODORIZING PETROLEUM AND MINERAL OILS.

A patent has been taken out by Mr. J. Moule, chemist, London, for the employment of deutoxide or nitrous gas in removing the offensive odor of petroleum and other mineral oils. One mode of procuring this gas is by using nitric or fuming nitrous acid in combination with shreds of iron, copper, or other metal, the nitrous gas thus formed is conducted from the outlet by means of a pipe or tube, into a vessel charged with petroleum to be deodorized, in such a way that this pipe or tube reaches to the bottom of the vessel, thus allowing the nitrous gas to force its way through the whole of the contents. The gas is continued to be generated and forced therein, until fumes of nitrous gas begin freely to escape from the petroleum or oil, thereby indicating its complete saturation. As soon as this has taken place, the whole is to be well roused by forcing air through the liquid, or by a suitable agitation, after which the vessel containing the liquid petroleum or oil is to be closed until, by testing, the petroleum or products thereof are found free from any disagreeable odor, the time for which will be in proportion to the amount of gas generated and forced therein. Should the temperature be so low as to render the petroleum thick, it should be heated to a temperature of 100° Fah., and by thus liquefying it the deodorization will be more quickly and easily effected. Another modification of this deodorizing process is to pass the nitrous gas during the distillation of petroleum into the upper part of the still, so as to bring the nitrous gas into contact with the vapors arising therefrom. The gas for this purpose is collected in a suitable gasholder, and by pressure forced into contact with the petroleum vapors, the proportion of gas being regulated by a suitable stop-cock. The nitrous gas in this process may also be used in combination with ordinary or superheated steam, if thought more desirable. As it may be found convenient to effect the deodorization of the crude petroleum in the casks, other means are made use of, as follows: Into a cask, the contents of which are about 40 gallons, there are poured three or four pounds of nitric or fuming nitrous acid, and the contents thoroughly roused by means of a suitable agitation, or by forcing air through a pipe to the bottom of the cask. After rousing the contents for about five minutes, there is thrust into the cask containing the petroleum and acid about two pounds of scraps or filings of iron, which should be previously moistened with water. The iron coming in contact with the acid, nitrous gas is generated, and, by saturating the petroleum, deodorization is effected. Should the deodorization be not thoroughly complete, the contents are again roused, more acid and iron being added, until the object is accomplished. The petroleum or other products, while being subjected to the above treatment, and previous to distillation, should have the acid wholly removed or neutralized by decantation and washing with suitable alkaline substances, or by the addition and subsequent agitation of fresh slacked lime, in the proportion of 6 lbs. of lime to 40 gallons of petroleum. After distillation, the oil is sometimes again submitted to the action of nitrous gas.

### GAS IN GERMANY.

There are in Germany 266 gas-works, of which 66 are worked by townships or individuals, and 200 belong to various companies. The combustible employed is chiefly coal, the largest quantity being supplied from England. Out of 7¼ million quintals, 3,350,000 are obtained from the English colleries. Berlin, which produces annually 800 million cubic feet of gas, uses about half of this quantity of coal. Hamburg takes more than 500,000 quintals, and the rest is used in the gas-works of Altona, Lubeck, Rostock, Stralsund, Stettin, Dantzic, Konigsberg, &c. The excellent quality of the English coal for gas-making causes the preference to be given to it over indigenous coal; but if the cost of transport of the latter can be cheapened, it is thought that it will ere long come into use in Hamburg, Berlin, and other towns. The following are the percentage proportions in which the various coal is used in Germany:

| | |
|---|---|
| English coal | 46.00 |
| Westphalia | 18.00 |
| Moravia | 11.50 |
| Zwicken | 7.50 |
| Saarbuck | 7.00 |
| Silesia | 5.00 |
| Dresden | 2.25 |
| Bohemia | 2.00 |
| Northern Bavaria | 0.75 |
| | 100.00 |

Besides the gas-works which consume coal, Germany possesses 20 in which wood alone is employed for distillation; and there are two small works in Holstein, which consume peat, or turf, at certain times, and at others coal. The retorts used are generally of clay, except in those works where gas is made from wood. The total number of retorts employed is estimated at 7,337, made for the most part in the immediate locality of the works; their form and size differs considerably. Assuming that the mean consumption of gas in the 24 hours is 25 millions of cubic feet, and supposing that each retort furnishes daily 4,500 cubic feet, it follows that these 7,337 retorts must be continually, or three-fourths of the time, in work. The use of exhausters is much less general than would be supposed. There are only 90, or less than a third of the whole of the gas-works in Germany which employ about 107 exhausters. The small works do not employ them at all. The meters in general use are water-meters of native manufacture, and may number about 139,000. The mean number of lights of each is about eight.—*London Artizan.*

# GAS-LIGHT COMPANIES IN THE UNITED STATES.

*Compiled from official sources expressly for the* AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY, No. 39 NASSAU STREET, NEW YORK, DEALER IN GAS-LIGHT SHARES.

| When Chartered. | Town. | State. | Chartered Capital. | Par Val. Per Sh. $ | Semi-Ann'l Div'd. | Dividends Payable. | Population of Gas District. | Price per 1000 Feet. | Asked pr. cent. | Offered pr. cent. | REMARKS. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1857 | ADRIAN | Mich. | 50,000 | 50 | — | May & November. | 4,000 | 3 50 | .... | .... | |
| 1856 | AKRON | O. | 20,000 | 33⅓ | — | Do. | 3,500 | 3 00 | .... | .... | |
| 1845 | ALBANY | N. Y. | 25 ,000 | 20 | 4 | January & July. | 65,000 | 3 00 | 120 | .... | None in market. |
| 1858 | ALBION | N. Y. | 30,000 | 100 | — | Do. | 3,000 | 3 80 | .... | .... | |
| 1851 | ALEXANDRIA | Va. | 106,530 | — | — | City Works. | 9,000 | 3 50 | .... | .... | |
| 1852 | ALLEGHANY | Pa. | 200,000 | 25 | 4 | May & November. | 25,000 | 3 00 | .... | .... | |
| 1853 | ALLENTOWN | Pa. | 60,000 | 100 | 3½ | Do. | 5,000 | 3 50 | .... | .... | |
| 1857 | ALTON | Ill. | 75,000 | — | — | Private Works. | 4,000 | 3 50 | .... | .... | |
| 1859 | ALTOONA | Pa. | 40,000 | 20 | 4 | January & July. | 5,000 | 3 00 | .... | .... | |
| 1859 | AMESBURY AND SALISBURY | Mass. | 30,000 | 25 | — | Do. | 7,000 | 4 00 | .... | .... | |
| 1858 | ANNAPOLIS | Md. | 100,000 | 25 | — | Do. | 4,000 | 4 00 | .... | .... | |
| 1858 | ANN ARBOR | Mich. | 23,000 | 50 | 5 | March & September. | 5,500 | 4 00 | .... | .... | |
| 1858 | ASTORIA | N. Y. | 20,000 | 50 | — | Do. | 6,000 | 4 00 | .... | .... | |
| 1855 | ATLANTA | Ga. | 50,000 | 25 | 5 | January & July. | 12,000 | 5 00 | .... | .... | |
| 1857 | ATTLEBORO' | Mass. | 6,000 | 50 | 3 | Do. | 2,000 | 6 00 | .... | .... | |
| 1850 | AUBURN | N. Y. | 80,000 | 50 | 5 | Do. | 10,000 | 7 00 | .... | .... | |
| 1851 | AUGUSTA | Ga. | 80,000 | 25 | 8 | Do. | 9,000 | 6 00 | .... | .... | |
| 1853 | AUGUSTA AND HALLOWELL | Me. | 84,700 | 50 | 5 | Do. | 10,000 | 4 00 | .... | .... | |
| 1860 | AURORA | Ind. | 10,000 | — | — | Private Works. | 3 500 | 3 50 | .... | .... | Formerly used Sanders' Water-Gas. Recently altered to Coal Gas-Works. None for sale. |
| 1817 | BALTIMORE | Md. | 550,000 | 100 | 5 | June & December. | 150,000 | 2 50 | 150 | .... | |
| 1852 | BANGOR | Me. | 120,000 | 100 | 4 | January & July. | 12,000 | 3 50 | .... | .... | |
| 1855 | BATAVIA | N. Y. | 32,000 | 20 | 4 | Do. | 2,500 | 4 00 | .... | .... | |
| 1853 | BATH | Me. | 65 000 | 100 | 3 | April & October. | 10,000 | 3 75 | .... | .... | |
| 1859 | BATH | N. Y. | 15,000 | 50 | — | May & November. | 3,000 | 7 00 | .... | .... | |
| 1861 | BATTLE CREEK | Mich. | 15,000 | — | — | January & July. | | | .... | .... | |
| 1858 | BELFAST | Me. | 14,000 | 100 | — | Do. | 7,000 | 7 00 | .... | .... | |
| 1856 | BELLEFONT | Pa. | 20,000 | 25 | 2 | Do. | 3,500 | 4 00 | .... | .... | |
| | BELOIT | Wis. | 30,000 | — | — | Do. | 4,000 | 4 00 | .... | .... | |
| 1854 | BETHLEHEM | Pa. | 50,000 | 50 | 4 | June & December. | 2,000 | 3 20 | .... | .... | |
| 1859 | BEVERLY | Mass. | 40,000 | 100 | — | January & July. | 4,000 | 4 00 | .... | .... | |
| 1853 | BINGHAMPTON | N. Y. | 50,000 | 50 | 3½ | Do. | 10,000 | 4 00 | .... | .... | |
| 1849 | BIRMINGHAM | Pa. | 40,000 | 50 | — | Do. | 4,000 | 4 00 | .... | .... | |
| 1855 | BLOOMINGTON | Ill. | 40,000 | 50 | — | Do. | 6,000 | 4 00 | .... | .... | |
| 1853 | BORDENTOWN | N. J. | 50,000 | 25 | 3 | June & December. | 4,000 | 3 80 | .... | .... | |
| 1822 | BOSTON | Mass. | 1,000,000 | 500 | 5 | Do. | 130,000 | 2 25 | .... | .... | |
| 1850 | BRATTLEBORO' | Vt. | 21,000 | — | — | Do. | 3,000 | 4 00 | .... | .... | |
| 1851 | BRIDGEPORT | Ct. | 90,000 | 25 | 4 | January & July. | 10,000 | 4 00 | 90 | .... | Passed last dividend. |
| 1857 | BRIDGETON | N. J. | 50,000 | 20 | — | Do. | 5,000 | 4 00 | .... | .... | |
| 1856 | BRISTOL | Pa. | 30,000 | 25 | 3 | February & August. | 3,000 | 4 00 | .... | .... | |
| 1855 | BRISTOL | R. I. | 35,000 | 50 | 2 | January & July. | 6,000 | 4 00 | .... | .... | |
| 1859 | BROCKPORT | N. Y. | 25,000 | 100 | 3 | Do. | 1,500 | 4 00 | .... | .... | |
| 1858 | BROOKLINE | Mass. | 66,000 | 100 | 3½ | February & August. | 3,500 | 3 50 | .... | .... | |
| 1825 | BROOKLYN | N. Y. | 2,000,000 | 25 | 5 | January & July. | 75,000 | 2 50 | 170 | 160 | |
| | BROWNSVILLE | Pa. | | | | Do. | | | .... | .... | |
| 1848 | BUFFALO | N. Y. | 600,000 | 50 | 5 | Do. | 70,000 | 2 90 | 140 | 125 | |
| 1852 | BURLINGTON | N. J. | 100,000 | 25 | 3½ | Do. | 5,000 | 4 00 | 105 | .... | |
| 1858 | BURLINGTON | Vt. | 75,000 | 25 | 2½ | Do. | 10,000 | 4 50 | .... | .... | |
| 1859 | BURLINGTON | Iowa. | 65,000 | 50 | — | Do. | 8,000 | 4 00 | .... | .... | |
| 1861 | CALAIS | Me. | 90,000 | 100 | — | Do. | 10,000 | 3 50 | .... | .... | |
| 1852 | CAMBRIDGE | Mass. | 300,000 | 100 | 5 | February & August. | 20,000 | 3 50 | 100 | 97½ | |
| 1852 | CAMDEN | N. J. | 300,000 | 100 | 3 | April & October. | 15,000 | 3 50 | 105 | 100 | |
| 1858 | CANANDAIGUA | N. Y. | 50,000 | 50 | — | January & July. | 3,000 | 4 00 | 90 | 80 | |
| 1856 | CANTON | O. | 19,000 | 50 | 6 | March & September. | 6,000 | 3 00 | .... | .... | |
| 1853 | CAPE ISLAND | N. J. | 80,000 | 100 | — | October. | 10,000 | 6 00 | .... | .... | Watering place.—These Works only run in summer. |
| 1860 | CARBONDALE | Pa. | 16,000 | 25 | — | March & September. | 5,000 | 4 00 | .... | .... | |
| 1855 | CARLISLE | Pa. | 30,000 | 25 | — | January & July. | 4,000 | 4 00 | .... | .... | |
| 1856 | CATASAUQUA | Pa. | 15,000 | 25 | 5 | May & November. | 2,000 | 4 00 | .... | .... | |
| 1858 | CATSKILL | N. Y. | | — | — | Private Works. | 3,000 | 3 00 | .... | .... | Owned by G. T. Sutton. |
| 1857 | CHAMBERSBURG | Pa. | 30,000 | 25 | — | January & July. | 3,000 | 4 00 | .... | .... | |
| 1846 | CHARLESTON | S. C. | 723,800 | 25 | 4 | Do. | 50,000 | 4 00 | .... | .... | |
| 1851 | CHARLESTOWN | Mass. | 200,000 | 50 | 4 | Do. | 30,000 | 3 00 | 105 | .... | |
| 1853 | CHARLOTTE | N. C. | 14,000 | 50 | 10 | March & September. | 3,500 | 6 00 | .... | .... | |
| 1859 | CHARLOTTEVILLE | Vt. | 15,000 | 25 | — | Do. | 4,000 | 4 50 | .... | .... | |
| 1851 | CHELSEA | Mass. | 100,000 | 100 | 3½ | January & July. | 8,000 | 3 50 | .... | .... | |
| 1856 | CHESTER | Pa. | 35,000 | 25 | 3 | April & October. | 4,000 | 4 00 | .... | .... | |
| 1849 | CHICAGO | Ill. | 1,300,000 | 25 | 5 | January & July. | 100,000 | 2 50 | 150 | 140 | Very scarce. Stock wanted. |
| 1857 | CHICOPEE | Mass. | 50,000 | 20 | — | Do. | | 4 00 | .... | .... | |
| 1851 | CHILLICOTHE | O. | 40,000 | 25 | 4 | Do. | 12,000 | 3 50 | .... | .... | |
| 1841 | CINCINNATI | O. | 1,600,000 | 100 | 5 | Do. | 225,000 | 2 50 | .... | .... | |
| 1859 | CITIZENS', BROOKLYN | N. Y. | 1,000,000 | 20 | — | Do. | 135,000 | 2 00 | 128 | 125 | |
| 1860 | CITIZENS', READING | Mass. | 90,000 | 100 | — | | | | .... | .... | |
| | CLARKESVILLE | Tenn. | 100,000 | 50 | — | Do. | 5,000 | 4 00 | .... | .... | |
| 1860 | CLAREMONT | N. H. | 20,000 | 100 | — | March & September. | 3,000 | 4 00 | .... | .... | |
| 1846 | CLEVELAND | O. | 200,000 | 10 | 5 | January & July. | 20,000 | 3 00 | .... | .... | |
| 1858 | CLINTON | Mass. | 30,000 | 500 | 5 | Do. | 3,000 | 4 00 | .... | .... | |
| 1859 | CLYDE | N. Y. | 10,000 | 50 | 4 | Do. | 2,500 | 4 00 | .... | .... | |
| 1854 | COHOES | N. Y. | 50,000 | 20 | 8½ | April & October. | 5,000 | 3 00 | .... | .... | Formerly Rosin-Gas, but now Coal. A well managed company. Stock firmly held. |
| 1860 | COLD SPRING | N. Y. | 30,000 | 50 | — | Do. | 3,500 | 4 00 | 80 | .... | |
| 1860 | COLD WATER | Mich. | 25,000 | 50 | 5 | January & July. | 4,000 | 4 00 | .... | .... | |
| 1852 | COLUMBIA | Pa. | 37,500 | 25 | — | Do. | 4,000 | 3 50 | .... | .... | |
| 1852 | COLUMBIA | S. C. | 44,000 | 25 | 4 | Do. | 6,000 | 6 00 | .... | .... | |
| 1857 | COLUMBIA | Cal. | 50,000 | 25 | — | Do. | 4,500 | 10 00 | .... | .... | |
| 1858 | COLUMBUS | Ga. | 54,000 | 25 | 5 | Do. | 5,000 | 7 00 | .... | .... | |
| 1850 | COLUMBUS | O. | 100,000 | 10 | 6 | Do. | 30,000 | 3 00 | .... | .... | |
| 1858 | CONCORD | N. H. | 50,000 | 50 | 5 | Do. | 8,000 | 3 50 | .... | .... | |
| 1858 | COVINGTON AND NEWPORT | Ky. | 100,000 | 50 | 3½ | Do. | 28,000 | 4 00 | .... | .... | |
| 1854 | CUMBERLAND | Md. | 60,000 | 50 | 3 | Do. | 6,000 | 4 00 | .... | .... | |
| 1857 | DANBURY | Ct. | 50,000 | 25 | 4 | Do. | 2,000 | 3 75 | .... | .... | |
| 1856 | DANVILLE | Pa. | 30,000 | 25 | — | June & December. | 3,000 | 4 00 | .... | .... | |
| 1855 | DAVENPORT | Iowa. | 56,000 | 100 | — | Do. | 6,000 | 5 00 | .... | .... | |
| 1848 | DAYTON | O. | 50,000 | 25 | 5 | February & August. | 8,000 | 3 50 | .... | .... | |
| 1853 | DEDHAM | Mass. | 40,000 | 50 | — | January & July. | 3,000 | 4 00 | .... | .... | |
| 1860 | DELAWARE | O. | 30,000 | 25 | — | Do. | 2,500 | 3 00 | .... | .... | |
| 1849 | DETROIT | Mich. | 500,000 | 50 | 5 | Do. | 30,000 | 3 50 | 160 | 150 | Excellent Stock. No sales. |
| 1860 | DOBBS' FERRY | N. Y. | 25,000 | — | — | Do. | 3,000 | 4 00 | .... | .... | |
| 1854 | DORCHESTER | Mass. | 150,000 | 100 | — | Do. | 14,600 | 4 00 | .... | .... | |
| 1859 | DOVER | Del. | 12,000 | — | — | Private Works. | 2,000 | 4 00 | .... | .... | |
| | DOVER | N. H. | | | | January & July. | | | .... | .... | |
| 1857 | DOYLESTOWN | Pa. | 50,000 | — | — | Do. | 3,000 | 4 00 | .... | .... | |
| 1854 | DUBUQUE | Iowa. | 100,000 | 50 | — | Do. | 17,000 | 4 50 | .... | .... | |
| 1853 | EAST BOSTON | Mass. | 133,000 | 25 | 4 | Do. | 20,000 | 3 50 | .... | 145 | No transactions. |
| 1858 | EAST GREENWICH | R. I. | 11,200 | 100 | 15 | Do. | 3,000 | 7 00 | .... | .... | |
| 1861 | EAST HAMPTON | Mass. | 10,000 | 25 | — | Do. | 5,000 | 9 00 | .... | .... | |
| 1861 | EAST NEW YORK | N. Y. | 50,000 | 50 | — | Do. | 12,000 | 3 50 | .... | .... | |
| 1857 | EASTON | Md. | 9,000 | 10 | — | Do. | 1,500 | 7 00 | .... | .... | |
| 1850 | EASTON | Pa. | 125,000 | 50 | 4 | June & December. | 6,000 | 3 60 | .... | .... | |
| 1856 | EASTPORT | Me. | 50,000 | 55 | — | Do. | 3,000 | 4 00 | .... | .... | |
| 1855 | ELIZABETH | N. J. | 100,000 | 20 | 4 | January & July. | 14,000 | 3 50 | .... | .... | |
| | ELLICOTT'S MILLS | Md. | 10,000 | — | — | Do. | 4,000 | 4 00 | .... | .... | |
| 1852 | ELMIRA | N. Y. | 50,000 | 25 | 3½ | Do. | 5,000 | 4 00 | .... | .... | |
| 1852 | ERIE | Pa. | 68,000 | 50 | 3½ | June & December. | 10,000 | 3 00 | .... | .... | |
| 1853 | EVANSVILLE | Ind. | 60,000 | 50 | 4 | January & July. | 12,000 | 4 00 | 110 | .... | A very good Company. |
| | EXETER | N. H. | 60,000 | — | — | Do. | 12,000 | | .... | .... | |
| | FAIR HAVEN | Ct. | 20,000 | 25 | | Do. | 8,000 | 4 00 | .... | .... | |
| 1847 | FALL RIVER | Mass. | 26,000 | — | — | Private Works. | 12,000 | 3 50 | .... | .... | |
| 1859 | FAYETTEVILLE | N. C. | 25,000 | 100 | 6 | January & July. | 7,000 | 6 00 | .... | .... | |
| | FIFTH WARD (Milwaukee) | Wis. | 50,000 | 25 | — | Do. | 10,000 | 4 00 | .... | .... | |
| 1857 | FISHKILL | N. Y. | 10,000 | 20 | — | April & October. | 1,500 | 9 00 | .... | .... | |
| 1858 | FITCHBURG | Mass. | 100,000 | 50 | 3 | January & July. | 5,000 | 4 00 | .... | .... | Make Petroleum-Gas. |
| 1859 | FLEMINGTON | N. J. | 20,000 | — | — | Do. | 3,000 | 4 00 | .... | .... | |
| 1855 | FLUSHING | N. Y. | 40,000 | 50 | 1½ | March & September. | 6,500 | 4 00 | .... | .... | |
| 1858 | FORT WAYNE | Ind. | 50,000 | 25 | — | Do. | 6,000 | 4 00 | .... | .... | |
| 1851 | FRANKFORT | Ky. | 30,000 | — | — | City Works. | 5,500 | 4 50 | .... | .... | |
| 1851 | FREDERICK CITY | Md. | 36,000 | 100 | — | January & July. | 5,000 | 6 70 | .... | .... | |
| 1854 | FREDERICKSBURG | Va. | 72,500 | 50 | 5 | Do. | 4,500 | 4 00 | .... | .... | |
| 1858 | FREDONIA (Natural Gas) | N. Y. | 10,000 | 100 | — | Do. | 2,000 | 4 00 | .... | .... | Unlimited supply of Natural Gas. |
| 1856 | FREEPORT | Ill. | 20,000 | 100 | — | May & November. | 10,000 | 4 00 | .... | .... | |

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| When Chartered. | Town. | State. | Chartered Capital. | Par Val. Per Sh. $ | Semi-Ann'l Div'd. | Dividends Payable. | Population of Gas District. | Price per 1000 Feet. | Asked pr. cent. | Offered pr. cent. | REMARKS. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1859 | Fremont | O. | 25,000 | 25 | — | May & November. | 2,000 | 4 50 | .... | .... | |
| 1858 | Fulton | N. Y. | 12,000 | 100 | — | Do. | 4,000 | 7 00 | .... | .... | |
| 1855 | Galena | Ill. | 70,000 | 100 | — | Do. | 8,000 | 4 00 | .... | .... | |
| 1859 | Galion | O. | 25,000 | 25 | — | January & July. | 1,800 | 3 00 | .... | .... | |
| 1858 | Galveston | Texas. | 150,000 | 50 | — | May & November. | 7,000 | 6 00 | .... | .... | |
| 1854 | Gardiner | Me. | 100,000 | 50 | 4 | Do. | 8,000 | 4 00 | .... | .... | |
| 1853 | Geneva | N. Y. | 75,000 | 25 | 2½ | Do. | 6,000 | 4 00 | .... | .... | |
| 1851 | Germantown | Pa. | Merged | into | the | Philadelphia Works. | 12,000 | 2 25 | .... | .... | |
| 1859 | Gettysburg | Pa. | 20,000 | 50 | 3 | January & July. | 2,500 | 4 00 | .... | .... | |
| 1854 | Glenn's Falls | N. Y. | 25,000 | 50 | 3 | February & August. | 4,000 | 4 00 | .... | .... | |
| 1854 | Gloucester | Mass. | 40,000 | 50 | — | January & July. | 5,000 | 3 50 | .... | .... | |
| 1857 | Gloversville | N. Y. | 15,000 | 25 | — | Do. | 3,000 | 3 50 | .... | .... | |
| 1858 | Grand Rapids | Mich. | 50,000 | 20 | — | Do. | 3,000 | 4 00 | .... | .... | |
| 1855 | Great Barrington | Mass. | 5,000 | 100 | 5 | April & October. | 2,000 | 7 00 | .... | .... | |
| 1849 | Great Falls | N. H. | 50,000 | 100 | 3 | Do. | 3,000 | 4 00 | .... | .... | |
| 1860 | Greenfield | Mass. | 20,000 | 50 | 2 | January & July. | 2,500 | 4 00 | .... | .... | Close corporation. |
| 1853 | Greenpoint | N. Y. | 100,000 | 50 | 5 | Do. | 20,000 | 3 00 | .... | .... | |
| 1859 | Greensboro' | N. C. | 12,000 | 50 | — | April & October. | 3,000 | 7 00 | .... | .... | |
| 1858 | Greensburg | Pa. | 30,000 | 25 | 3 | May & November. | 2,000 | 3 00 | .... | | |
| 1854 | Hagerstown | Md. | 15,000 | 20 | — | January & July. | 2,000 | 6 00 | .... | .... | |
| | Hamilton | O. | 15,000 | | | Do. | | | .... | .... | |
| 1859 | Hannibal | Mo. | 100,000 | 100 | — | Do. | 6,000 | 3 50 | .... | .... | |
| 1857 | Harlem | N. Y. | 350,000 | 50 | 3½ | Do. | 25,000 | 3 00 | .... | 145 | |
| 1855 | Harrisburg | Pa. | 100,000 | — | 4 | Do. | 5,000 | 4 00 | .... | .... | |
| 1849 | Hartford | Ct. | 200,000 | 25 | 4 | Do. | 25,000 | 3 00 | 150 | 140 | Stock in demand. |
| | Hastings | N. Y. | | | | Do. | 8,000 | 4 00 | ... | .... | |
| 1853 | Haverhill | Mass. | 50,000 | 50 | — | Do. | 5,000 | 4 00 | .... | .... | |
| 1859 | Haverstraw | N. Y. | 20,000 | 100 | — | Do. | 5,000 | 4 00 | .... | .... | |
| 1861 | Hayesville | Mass. | 15,000 | 25 | | Do. | 4,000 | 4 00 | .... | .... | |
| 1859 | Hempstead | N. Y. | 16,000 | 25 | — | Do. | 1,000 | 4 00 | .... | .... | |
| 1862 | Hoboken | N. J. | 100,000 | 25 | 3 | Do. | 30,000 | 2 50 | .... | 100 | Works not yet built. |
| 1856 | Hollidaysburg | Pa. | 30,000 | 25 | 2 | Do. | 4,000 | 3 50 | .... | .... | |
| 1861 | Holyoke | Mass. | 20,000 | 25 | — | Do. | 3,000 | 4 00 | .... | .... | |
| 1861 | Homer & Cortlandt | N. Y. | 40,000 | 100 | — | Do. | 6,000 | 4 00 | .... | .... | |
| 1854 | Honesdale | Pa. | 30,000 | 25 | 3 | Do. | 2,500 | 4 00 | .... | .... | |
| 1860 | Hornellsville | N. Y. | 12,000 | 50 | — | Do. | 2,000 | 4 00 | .... | .... | |
| 1853 | Hudson | N. Y. | 50,000 | 100 | 3½ | February & August. | 3,000 | 4 00 | .... | .... | |
| | Hunter's Point | N. Y. | | | | | | | | | |
| 1857 | Huntington | Pa. | 18,000 | 50 | 3 | Do. | 2,000 | 3 50 | .... | .... | |
| 1856 | Huntsville | Ala. | 7,325 | 25 | — | June & December. | 2,000 | 5 00 | .... | .... | |
| | Indianapolis | Ind. | 150,000 | — | — | Do. | 15,000 | 5 00 | .... | .... | |
| 1857 | Iowa City | Iowa. | 40,000 | 50 | — | February & August. | 4,000 | 4 50 | .... | .... | |
| 1852 | Ithaca | N. Y. | 75,000 | 25 | 3½ | January & July. | 6,000 | 4 00 | .... | .... | |
| 1857 | Jackson | Mich. | 25,000 | 50 | 5 | Do. | 6,000 | 3 50 | .... | .... | |
| | Jackson | Miss. | 80,000 | 50 | — | Do. | 4,000 | 4 50 | .... | .... | |
| | Jackson | Cal. | 50,000 | 30 | — | Do. | 4,000 | 10 00 | .... | .... | |
| | Jacksonville | Flor. | 30,000 | 20 | — | Do. | 2,000 | 7 00 | .... | .... | |
| | Jacksonville | Ind. | 50,000 | 50 | — | Do. | 4,000 | 5 00 | .... | .... | |
| 1858 | Jacksonville | Mo. | 25,000 | 25 | — | Do. | 7,000 | 6 00 | .... | .... | |
| 1856 | Jamaica | N. Y. | 20,000 | — | 4 | Do. | 6,000 | 4 00 | .... | .... | |
| 1853 | Jamaica Plain | Mass. | 75,000 | 100 | 3½ | Do. | 3,000 | 3 50 | .... | .... | |
| | Jamestown | N. Y. | 25,000 | — | — | Do. | 4,000 | 4 00 | .... | .... | |
| 1856 | Janesville | Wis. | 50,000 | 100 | — | Do. | 12,000 | 4 00 | .... | .... | |
| | Jeffersonville | Md. | 30,000 | 25 | | Do. | 4,000 | 4 00 | .... | .... | |
| 1853 | Jersey City | N. J. | 300,000 | — | 5 | Do. | 80,000 | 3 00 | 150 | .... | No sales since formation of Hoboken Co. |
| 1858 | Jersey Shore | Pa. | 15,000 | 25 | — | Do. | 2,000 | 3 70 | .... | .... | |
| 1856 | Johnstown | Pa. | 80,000 | 25 | 3 | Do. | 8,000 | 3 00 | .... | .... | |
| 1857 | Joliet | Ill. | 300,000 | 100 | — | June & December. | 6,000 | 4 00 | .... | .... | |
| 1858 | Kalamazoo | Mich. | 30,000 | 50 | 5 | Do. | 10,000 | 4 00 | .... | .... | |
| 1860 | Keene | N. H. | 60,000 | 100 | — | Do. | 4,500 | 4 00 | .... | .... | |
| 1855 | Keokuk | Iowa. | 100,000 | 100 | — | January & July. | 10,000 | 4 50 | .... | .... | |
| 1855 | Kingston | Pa. | 50,000 | 50 | — | Do. | 3,000 | 4 00 | .... | .... | |
| 1859 | Kittanning | Pa. | 20,000 | — | — | Doubtful. | 5,000 | 4 00 | .... | .... | Said to be a fraud. |
| 1854 | Knoxville | Tenn. | 63,000 | — | — | April & October. | 4,000 | 5 00 | .... | .... | |
| 1860 | Laconia | N. H. | 20,000 | 100 | — | Do. | 4,000 | 6 00 | .... | .... | |
| 1859 | La Crosse City | Wis. | 100,000 | 50 | — | June & December. | 10,000 | 5 00 | .... | .... | |
| 1854 | Lafayette | Ind. | 60,000 | 50 | 4 | January & July. | 10,000 | 3 25 | .... | .... | |
| 1856 | Lambertville | N. J. | 30,000 | 25 | — | Do. | 2,600 | 4 00 | .... | .... | |
| 1849 | Lancaster | Pa. | 100,000 | 50 | 4 | Do. | 10,000 | 3 00 | .... | .... | |
| 1856 | Lancaster | O. | 25,000 | 100 | 5 | Do. | 5,000 | 3 50 | .... | .... | |
| 1855 | Lansinburg | N. Y. | 25,000 | 100 | — | Private Works. | 7,000 | 4 00 | .... | .... | |
| 1849 | Lawrence | Mass. | 200,000 | 100 | 4 | February & August. | 15,000 | 3 50 | .... | .... | |
| 1859 | Leavenworth | Kansas. | 200,000 | 25 | — | January & July. | 10,000 | 5 00 | .... | .... | |
| 1856 | Lebanon | Pa. | 26,000 | 50 | — | February & August. | 5,000 | 4 00 | .... | .... | |
| 1861 | Le Roy | N. Y. | 25,000 | 50 | — | Do. | 4,000 | 4 00 | .... | .... | |
| 1858 | Lewisburg | Pa. | 20,000 | 100 | — | January & July. | 4,000 | 4 00 | .... | .... | |
| 1852 | Lewiston | Me. | 100,000 | 100 | 3 | Do | 10,000 | 3 20 | .... | .... | |
| 1856 | Lewistown | Pa. | 30,000 | 50 | 3 | April & October. | 3,000 | 3 10 | .... | .... | |
| 1853 | Lexington | Ky. | 100,000 | 25 | 4 | January & July. | 5,000 | 4 00 | .... | .... | |
| 1853 | Little Falls | N. Y. | 112,000 | 25 | — | Do. | 3,500 | 7 00 | .... | .... | |
| 1861 | Little Rock | Ark. | 20,000 | — | — | Do. | 5,000 | 6 00 | .... | .... | |
| 1858 | Lockhaven | Pa. | 28,000 | — | — | Do. | 3,000 | 4 00 | .... | .... | |
| | Lockport | N. Y. | 100,000 | 50 | — | Do. | 4,000 | 4 00 | .... | .... | |
| 1838 | Louisville | Ky. | 600,000 | 50 | 6 | Do. | 80,000 | 2 50 | 125 | .... | But $481,400 stock has been sold. This Company has a large contingent fund and undivided profit on hand. |
| 1849 | Lowell | Mass. | 200,000 | 25 | 5 | Do. | 50,000 | 3 25 | .... | .... | |
| 1852 | Lynchburg | Va. | 70,000 | 25 | 5 | Do. | 6,000 | 3 80 | .... | .... | |
| 1852 | Lynn | Mass. | 55,000 | 50 | 4 | Do. | 20,000 | 4 00 | .... | .... | |
| 1859 | Lyons | N. Y. | 30,000 | 100 | — | Do. | 4,000 | 4 00 | .... | .... | |
| 1852 | Macon | Ga. | 75,160 | 25 | 6 | Do. | 5,000 | 5 00 | .... | .... | |
| 1851 | Madison | Ind. | 160,000 | 25 | 3 | Do. | 10,100 | 3 50 | .... | .... | |
| 1855 | Madison | Wis. | 100,000 | 25 | — | Do. | 5,000 | 5 00 | .... | .... | |
| 1854 | Malden & Melrose | Mass. | 50,600 | 25 | 3 | February & August. | 5,000 | 4 00 | .... | .... | |
| 1852 | Manayunk | Pa. | 40,000 | 100 | — | Do. | 7,000 | 4 00 | .... | .... | |
| 1852 | Manchester | N. H. | 100,000 | 100 | 5 | January & July. | 25,600 | 3 00 | .... | .... | |
| 1830 | Manhattan (N. Y. City) | N. Y. | 4,000,000 | 50 | 5 | Do. | 600,000 | 2 50 | 300 | 375 | |
| | Mansfield | O. | 25,000 | — | — | Do. | 10,000 | 4 00 | .... | .... | |
| 1854 | Marblehead | Mass. | 40,000 | 100 | 3 | Do. | 1,000 | 4 00 | .... | .... | |
| | Marlboro' | Mass. | 20,000 | — | — | Do. | 8,000 | 4 00 | .... | .... | |
| | Mauch Chunk | Pa. | 50,000 | 50 | — | Do. | 7,000 | 4 00 | .... | .... | |
| 1857 | Marietta | O. | 50,000 | 50 | — | Do. | 7,000 | 4 00 | .... | .... | |
| 1858 | Marysville | Cal. | 50,000 | 100 | — | Do. | 4,000 | 12 50 | .... | .... | |
| 1857 | Massilon | O. | 20,000 | 25 | — | Do. | 5,000 | 3 00 | .... | .... | |
| 1855 | Meadville | Pa. | 39,500 | 25 | — | Do. | 4,000 | 3 50 | .... | .... | |
| | Medina | N. Y. | 2,000 | 100 | — | Do. | 2,000 | 7 00 | .... | .... | |
| 1852 | Memphis | Tenn. | 300,000 | 100 | 5 | June & December. | 12,000 | 3 50 | .... | .... | |
| | Meriden | Ct. | 20,000 | | | Do. | | | .... | .... | |
| 1869 | Metropolitan (N. Y. City) | N. Y. | 1,000,000 | 100 | — | January & July. | 200,000 | 2 50 | .... | .... | |
| 1859 | Middleboro' | Mass. | 15,000 | — | — | Private Works. | | 6 00 | .... | .... | |
| 1853 | Middletown | Ct. | 50,000 | 25 | 3 | March & September. | 5,000 | 3 80 | .... | .... | |
| | Middletown | N. Y. | | 25 | — | Private Works. | 3,000 | 3 00 | .... | .... | Owned by G. T. Sutton. |
| | Milford | Mass. | 20,000 | — | — | Do. | | 4 00 | .... | .... | |
| | Milledgeville | Ga. | 100,000 | 50 | — | Do. | | 5 00 | .... | .... | |
| | Milton | Pa. | 10,000 | | | Do. | | | .... | .... | |
| 1847 | Milwaukee | Wis. | 400,000 | 50 | 5 | January & July. | 24,000 | 3 50 | 150 | .... | |
| 1852 | Mobile | Ala. | 200,000 | — | — | Do. | 30,000 | 4 50 | .... | .... | |
| 1836 | Monroe | Mich. | 40,000 | 50 | — | Do. | 5,000 | 3 50 | 50 | .... | |
| 1852 | Montgomery | Ala. | 100,000 | 25 | 4 | February & August. | 7,000 | 6 00 | .... | .... | |
| 1856 | Montpelier | Vt. | 30,000 | 25 | 3 | January & July. | 5,000 | 4 50 | .... | .... | |
| 1859 | Morrisania | N. Y. | 30,000 | 50 | — | Do. | | 4 00 | .... | .... | |
| 1859 | Morristown | N. J. | 18,000 | 50 | — | Do. | 3,500 | 4 00 | .... | .... | |
| 1854 | Mount Holly | N. J. | 16,650 | 25 | 3 | April & October. | 2,000 | 7 00 | .... | .... | |
| | Mount Vernon | O. | 50,000 | 100 | — | Do. | | 4 00 | .... | .... | |
| 1857 | Muscatine | Iowa. | 50,000 | 100 | — | January & July. | 3,000 | 4 50 | ... | .... | |
| 1854 | Nantucket | Mass. | 50,000 | 100 | 3 | February & August. | 6,000 | 4 00 | .... | ... | |

## GAS-LIGHT COMPANIES IN THE UNITED STATES.—Continued.

*Compiled from official sources expressly for the* AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY, No. 39 NASSAU STREET, NEW YORK, DEALER IN GAS-LIGHT SHARES.

| When Chartered. | Town. | State. | Chartered Capital. | Par Val. per Sh. $ | Semi-Ann'l Div. | Dividends Payable. | Population of Gas District. | Price per 1000 Feet. | Asked pr. cent. | Offered pr. cent. | REMARKS. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1852 | Nashua | N. H. | 45,000 | 50 | 3½ | January & July. | 10,000 | 3 50 | .... | .... | |
| 1850 | Nashville | Tenn. | 250,000 | 50 | 5 | Do. | 25,000 | 3 50 | .... | .... | |
| 1858 | Natchez | Miss. | 46,000 | 50 | — | Do. | 20,000 | 5 00 | .... | ... | |
| 1852 | New Albany | Ind. | 200,000 | 50 | 3½ | Do. | 16,000 | 3 50 | .... | ... | |
| 1846 | Newark | N. J. | 362,000 | 50 | 5 | Do. | 45,000 | 3 62 | 130 | ... | Always a favorite stock. |
| 1856 | Newark | O. | 30,000 | 100 | — | Do. | 7,000 | 5 40 | .... | ... | |
| 1852 | New Bedford | Mass. | 180,000 | 100 | 5 | Do. | 15,000 | 2 90 | 102 | .... | Well managed and kept quiet. |
| 1850 | Newbern | N. C. | 22,000 | 100 | 6 | Do. | 6,000 | 3 50 | .... | .... | |
| | New Britain | Ct. | 30,000 | 20 | 5 | Do. | 3,000 | 4 00 | .... | .... | |
| 1851 | New Brunswick | N. J. | 100,000 | 20 | 4 | Do. | 8,000 | 3 00 | 115 | .... | |
| 1852 | Newburg | N. Y. | 67,000 | 20 | 4 | Do. | 10,000 | 4 00 | 105 | .... | |
| 1852 | Newburyport | Mass. | 150,000 | 10 | 4 | Do. | 9,000 | 4 00 | 92½ | .... | |
| 1857 | Newcastle | Del. | 32,300 | 10 | 3 | Do. | 4,000 | 4 00 | 90 | .... | |
| 1847 | New Haven | Ct. | 250,000 | 25 | 4 | Do. | 30,000 | 3 00 | 155 | .... | None in market. |
| 1853 | New London | Ct. | 70,000 | 50 | 3 | Do. | 12,000 | 4 00 | 105 | .... | Do. |
| 1835 | New Orleans | La. | 1,500,000 | 100 | 6 | Do. | 120,000 | 4 00 | 180 | .... | |
| 1853 | Newport | R. I. | 130,200 | 100 | 4 | Do. | 10,000 | 3 50 | 112 | .... | |
| 1854 | Newton & Watertown | Mass. | 300,000 | 100 | 2 | Do. | 10,000 | 4 00 | .... | .... | |
| | Newton | N. J. | 30,000 | — | — | Do. | 3,000 | 4 00 | .... | .... | |
| | Newton | Pa. | 20,000 | 50 | — | Do. | 2,000 | 4 00 | .... | .... | |
| 1823 | Newtown | N. Y. | | | | | | | | | |
| 1859 | New York | N. Y. | 1,000,000 | 50 | 5 | May & November. | 100,000 | 2 50 | 300 | .... | |
| | Niagara Falls | N. Y. | 15,000 | 25 | — | Do. | 3,000 | 4 00 | 90 | .... | |
| | Norfolk | Va. | 60,000 | 25 | — | Do. | 40,000 | 4 00 | .... | .... | |
| 1853 | Norristown | Pa. | 41,700 | 25 | 4 | June & December. | 8,000 | 3 50 | .... | .... | |
| 1855 | North Attleboro' | Mass. | 50,000 | 100 | 3½ | Do. | 6,000 | 4 00 | .... | .... | |
| | Northern Liberties | Pa. | 400,000 | 25 | 7 | City Works. | 40,000 | 2 50 | .... | .... | |
| | North Adams | Mass. | 25,000 | — | — | March & September. | 30,000 | 4 00 | .... | ... | |
| 1856 | Northampton | Mass. | 35,000 | 25 | 3 | January & July. | 4 500 | 4 00 | .... | .... | |
| 1859 | North Bridgewater | Mass. | 16,000 | 100 | 4 | June & December. | 1,000 | 7 00 | .... | .... | |
| 1856 | Norwalk | Ct. | 30,000 | 150 | 4 | February & August. | 6,000 | 4 00 | .... | .... | |
| 1859 | Norwalk | O. | 30,000 | 25 | — | January & July. | 4,000 | 4 00 | .... | .... | |
| 1854 | Norwich | Ct. | 75,000 | 25 | 3½ | Do. | 12,000 | 3 50 | .... | .... | |
| 1861 | Norwich | N. Y. | 12,000 | 50 | — | Do. | 2,500 | 4 00 | .... | .... | |
| 1859 | Nyack | N. Y. | 20,000 | 100 | — | Do. | 2,500 | 4 00 | .... | .... | |
| 1860 | Oberlin | O. | 10,000 | — | — | Do. | 1,200 | 4 00 | .... | ... | |
| 1855 | Ogdensburg | N. Y. | 75,000 | 50 | 5 | Do. | 9,000 | 4 00 | .... | ... | |
| 1859 | Orange | N. J. | 65,000 | 25 | — | Do. | 6,000 | 3 50 | .... | .... | |
| 1852 | Oswego | N. Y. | 81,250 | 100 | 3½ | Do. | 15,000 | 4 00 | 105 | .... | Good works, built by Hoy, Jr., & Kennedy. |
| 1855 | Ottawa | Ill. | 45,000 | 100 | 6½ | Do. | 6,000 | 4 00 | .... | .... | |
| 1856 | Owego | N. Y. | 40,000 | 50 | 3½ | Do. | 5,000 | 4 00 | .... | .... | |
| 1860 | Owensboro' | Ky. | 25,000 | 25 | — | Do. | 4,000 | 3 50 | .... | .... | |
| 1856 | Paducah | Ky. | 75,000 | 100 | — | May & November. | 4,000 | 5 00 | .... | .... | |
| 1861 | Painsville | O. | 40,000 | 25 | 5 | Do. | 2,500 | 5 00 | .... | .... | |
| 1856 | Palmyra | N. Y. | 12,000 | 25 | — | January & July. | 3,000 | 7 00 | .... | .... | |
| 1847 | Paterson | N. J. | 125,000 | 25 | 3 | Do. | 20,000 | 3 50 | 95 | .... | |
| 1850 | Pawtucket | R. I. | 75,000 | 50 | 4 | Do. | 12,000 | 3 00 | .... | .... | |
| 1855 | Peekskill | N. Y. | 31,000 | 50 | 3 | June & December. | 4,000 | 4 00 | .... | .... | Surplus $10,000, May 15, 1863. |
| 1860 | Penn Yan | N. Y. | 12,000 | 50 | 5 | Do. | 3,000 | 4 00 | .... | .... | Works leased to Gilbert T. Sutton. |
| 1859 | Peoples', Chicago | Ill. | 500,000 | 50 | New | Do. | 100,000 | 2 50 | .... | .... | |
| 1855 | Peoria | Ill. | 100,000 | 50 | 4 | Do. | 8,000 | 3 50 | .... | .... | What is this Company doing? |
| 1852 | Petersburg | Va. | 120,000 | — | 5 | January & July. | 20,000 | 3 80 | .... | .... | |
| 1841 | Philadelphia | Pa. | 8,000,000 | 50 | — | City Works. | 650,000 | 2 00 | .... | .... | |
| 1855 | Piqua | O. | 50,000 | 50 | — | January & July. | 6,500 | 4 00 | .... | .... | |
| 1835 | Pittsburg | Pa. | 300,000 | 100 | 5 | Do. | 60,000 | 1 50 | 115 | .... | |
| 1854 | Pittsfield | Mass. | 50,000 | 100 | 5 | Do. | 4,500 | 4 00 | .... | .... | |
| 1858 | Placerville | Cal. | 30,000 | 50 | — | Do. | 4,500 | 10 00 | .... | .... | |
| 1860 | Plainfield | N. J. | 25,000 | 50 | — | Do. | 2,500 | 4 00 | .... | .... | |
| 1859 | Plattsburg | N. Y. | 16,000 | 50 | — | January & July. | 5,000 | 7 00 | .... | .... | |
| 1858 | Plymouth | Mass. | 40,000 | 100 | — | April & October. | 8,000 | 4 00 | .... | .... | |
| 1860 | Port Chester | N. Y. | 50,000 | 50 | — | Do. | 4,000 | 4 00 | .... | .... | |
| 1860 | Port Jervis | N. Y. | 20,000 | 100 | — | Do. | 3,000 | 4 10 | .... | .... | |
| 1849 | Portland | Me. | 300,000 | 50 | 4 | January & July. | 30,000 | 3 00 | .... | .... | |
| 1859 | Portland | Oreg. | 50,000 | 50 | — | Do. | 3,500 | 8 00 | .... | .... | |
| 1859 | Port Lavacca | Texas. | 50,000 | 100 | — | Do. | 2,500 | 7 00 | .... | .... | |
| 1851 | Portsmouth | N. H. | 70,000 | 100 | 6 | April & October. | 6,500 | 3 70 | .... | .... | |
| 1855 | Portsmouth | O. | 50,000 | 50 | 4 | January & July. | 10,000 | 3 50 | .... | .... | |
| 1855 | Portsmouth | Va. | 100,000 | 50 | 4 | Do. | 4,000 | 4 00 | .... | .... | |
| 1856 | Pottstown | Pa. | 20,000 | 50 | 3 | Do. | 3,500 | 4 00 | .... | .... | |
| 1850 | Pottsville | Pa. | 110,000 | 50 | 2 | Do. | 10,000 | 3 50 | .... | .... | |
| 1850 | Poughkeepsie | N. Y. | 84,000 | 25 | 4 | March & September. | 15,000 | 3 50 | 120 | 110 | |
| 1848 | Providence | R. I. | 1,000,000 | 50 | 4 | January & July. | 60,000 | 3 00 | 122 | .... | |
| 1853 | Quincy | Ill. | 300,000 | 50 | 4 | June & December. | 12,000 | 3 50 | .... | .... | |
| | Quincy | Mass. | 00,000 | 00 | — | Do. | 00,000 | 0 00 | .... | .... | |
| 1855 | Racine | Wis. | 43,500 | 26 | — | Do. | 7,000 | 3 50 | .... | .... | |
| 1857 | Rahway | N. J. | 50,000 | 20 | — | January & July. | 5,000 | 4 00 | .... | .... | |
| 1858 | Raleigh | N. C. | 25,000 | 100 | 6 | May & Novrmber. | 5,000 | 6 00 | .... | .... | |
| 1848 | Reading | Pa. | 100,000 | 25 | 4 | January & July. | 25,000 | 3 00 | .... | .... | |
| 1851 | Richmond | Va. | 341,975 | — | — | City Works. | 30,000 | 3 00 | .... | .... | Jeff. Davis has extinguished the gas-lights of Richmond, Va. |
| 1859 | Richmond | Mass. | 40,000 | 25 | — | January & July. | 3,000 | 4 00 | .... | .... | |
| | Richmond County | N. Y. | | | | | | | | | |
| 1859 | Ripley | O. | 30,000 | 50 | — | Do | 2,000 | 4 50 | .... | .... | |
| 1852 | Rochester | N. Y. | 200,000 | 50 | 5 | Do. | 50,000 | 2 50 | .... | .... | |
| 1857 | Rockford | Ill. | 40,000 | 50 | — | Do. | 4,000 | 4 00 | .... | .... | |
| 1854 | Rock Island | Ill. | 100,000 | 50 | — | Do. | 6,000 | 4 50 | .... | .... | |
| 1854 | Rockland | Me. | 50,000 | 100 | — | Do. | 6,000 | 4 40 | .... | .... | |
| 1852 | Rome | N. Y. | 85,000 | 100 | 3½ | Do. | 10,000 | 3 60 | .... | .... | |
| 1854 | Rondout and Kingston | N. Y. | 65,150 | 20 | 3½ | June & December. | 10,000 | 3 80 | .... | .... | |
| 1854 | Roxbury | Mass. | 150,000 | 100 | 5 | January & July. | 20,000 | 3 50 | .... | .... | |
| 1859 | Rutland | Vt. | 20,000 | 25 | — | Do. | 4,000 | 3 50 | .... | .... | |
| | Saco | Me. | 71,600 | 100 | 3½ | April & October. | 8,000 | 4 00 | .... | .... | |
| 1857 | Sacramento | Cal. | 500,000 | 100 | — | Do. | 40,000 | 10 00 | .... | .... | |
| 1859 | Sag Harbor | N. Y. | 20,000 | — | — | Do. | 4,000 | 4 00 | .... | .... | |
| 1858 | Saint Albans | Vt. | 15,000 | 20 | — | Do. | 3,000 | 7 00 | .... | .... | |
| | Saint Johnsbury | Vt. | 30,000 | 25 | — | Do. | 4,000 | 4 00 | .... | .... | |
| 1857 | Saint Joseph | Mo. | 50,000 | 100 | 5 | January & July. | 6,000 | 5 00 | .... | .... | |
| 1859 | Saint Louis | Mo. | 600,000 | 50 | — | June & December. | 180,000 | 3 50 | .... | .... | |
| 1857 | Saint Paul | Min. | 200,000 | 50 | 3 | January & July. | 10,000 | 6 00 | .... | .... | Surplus $10,000, May 15, 1863. |
| 1856 | Salem | N. J. | 30,000 | 25 | 3 | Do. | 5,000 | 3 86 | .... | .... | |
| 1850 | Salem | Mass. | 200,000 | 100 | 4 | February & August. | 30,000 | 3 24 | .... | .... | |
| 1859 | Salem | O. | 25,000 | 20 | — | Do. | 3,000 | 3 00 | .... | .... | |
| 1859 | Salisbury | N. C. | 14,600 | 50 | 6 | May & November. | 3,500 | 6 00 | .... | .... | |
| | Salisbury Mills | Mass. | 1,250 | 25 | — | Do. | 3,000 | 4 00 | .... | .... | |
| | Salmon Falls | Me. | 25,000 | 100 | — | Do. | 3,000 | 4 00 | .... | .... | |
| | San Antonio | Texas. | 75,000 | 20 | — | Do. | 40,000 | 6 00 | .... | .... | |
| | San Diego | Cal. | 30,000 | 50 | — | Do. | 50,000 | 10 00 | .... | .... | |
| 1854 | Sandusky | O. | 75,000 | 50 | — | April & October. | 9,000 | 3 00 | .... | .... | |
| 1859 | Sandwich | Mass. | 10,000 | — | — | Private Works. | 2,000 | 3 50 | .... | .... | |
| 1852 | San Francisco | Cal. | 1,000,000 | 100 | 6 | Do. | 50,000 | 8 00 | 110 | .... | |
| 1853 | Saratoga Springs. | N. Y. | 39,000 | 100 | — | January & July. | 6,000 | 3 60 | 70 | .... | |
| | Saugerties | N. Y. | 30,000 | 20 | — | Do. | 4,000 | 3 00 | .... | .... | |
| 1849 | Savannah | Ga. | 200,000 | 25 | 5 | Do. | 10,000 | 3 75 | .... | .... | |
| 1851 | Schenectady | N. Y. | 50,000 | — | — | Private Works. | 11,000 | 4 00 | .... | .... | |
| 1858 | Scranton, Gas and Water. | Pa. | 100,000 | 25 | — | January & July. | 6,000 | 3 80 | .... | .... | About trying Water-Gas. |
| 1857 | Selma | Ala. | 20,000 | 100 | — | Do. | 2,000 | 5 00 | .... | .... | |
| 1856 | Seneca Falls and Waterloo | N. Y. | 80,000 | 50 | 3 | Do. | 10,000 | 4 00 | 100 | .... | |
| | Shreveport | La. | 40,000 | 25 | — | Do. | 3,000 | 0 50 | .... | .... | |
| 1856 | Sing Sing | N. Y. | 40,000 | 100 | — | Do. | 3,000 | 4 00 | .... | .... | |
| | Smyrna | Del. | | | | | | 4 00 | .... | .... | Petroleum Gas. |
| 1860 | South Adams | Mass. | 10,000 | 25 | — | Do. | 3,000 | 4 00 | .... | .... | |
| 1859 | South Bridge | Mass. | 5,000 | 25 | — | Do. | 4,010 | 6 00 | .... | .... | |
| | South Boston | Mass. | 200,000 | 50 | — | Do. | 60,000 | 3 25 | 110 | .... | |
| | Springfield | O. | 200,000 | 100 | — | Do | 20,000 | 3 50 | .... | .... | |
| 1854 | Springfield | Ill. | 75,000 | 50 | — | January & July. | 10,000 | 3 50 | .... | .... | |
| 1848 | Springfield | Mass. | 100,000 | 500 | 5 | February & August. | 10,000 | 3 60 | 140 | .... | |
| 1855 | Stamford | Ct. | 6,250 | 25 | 5 | April & October. | 3,000 | 3 50 | .... | .... | |
| 1857 | Staten Island | N. Y. | 150,000 | 50 | 5 | January & July. | 26,000 | 4 00 | 95 | .... | |

## GAS-LIGHT COMPANIES IN THE UNITED STATES.—Continued.

*Compiled from official sources expressly for the* AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY, No. 39 NASSAU STREET, NEW YORK, DEALER IN GAS-LIGHT SHARES.

| When Chartered. | Town. | State. | Chartered Capital. | Par Val. per Sh. $ | Semi-Ann'l Div'd. | Dividends Payable. | Population of Gas District. | Price per 1000 Feet. | Asked pr. cent. | Offered pr. cent. | REMARKS. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1859 | Staunton | Va. | 18,000 | 50 | 6 | January & July. | 4,000 | 7 00 | .... | .... | |
| | Steubenville | O. | 150,000 | 100 | — | Do. | 15,000 | 4 00 | .... | .... | |
| | Stockton | Cal. | 50,000 | — | — | Do. | 8 000 | 10 00 | | .... | |
| 1848 | Syracuse | N. Y. | 125,000 | 25 | 5 | March & September. | 25,000 | 3 00 | 112 | .... | |
| | Tamaqua | Pa. | 40,000 | 25 | — | Do. | 3,000 | 4 00 | ... | .... | |
| 1859 | Tarrytown and Irvington | N. Y. | 70,000 | 50 | — | January & July. | 3,000 | 4 00 | .... | .... | |
| 1853 | Taunton | Mass. | 100,000 | 50 | 4 | Do. | 10,000 | 4 00 | .... | .... | |
| | Terre Haute | Ind. | 100,000 | 100 | — | Do. | 3,000 | 4 00 | .... | .... | |
| | Thompsonville | Ct. | 25,000 | 50 | — | Do. | 4,000 | 4 50 | .... | .... | |
| | Tiffin | O. | 25,000 | 20 | — | Do. | 4,000 | 4 00 | ... | .... | |
| 1853 | Toledo | O. | 100,000 | 50 | 3 | Do. | 8,000 | 3 50 | .... | .... | |
| 1847 | Trenton | N. J. | 100,000 | 20 | 4 | Do. | 15,000 | 3 42 | .... | 110 | |
| 1848 | Troy | N. Y. | 200,000 | 100 | 4 | June & December. | 35,000 | 3 60 | 160 | .... | |
| 1856 | Urbana | O. | 30,000 | 25 | — | April & October. | 3,500 | 4 00 | .... | .... | |
| 1849 | Utica | N. Y. | 80,000 | 100 | 4 | Do. | 22,000 | 3 60 | .... | .... | |
| 1858 | Vicksburg | Miss. | 66,000 | 50 | — | March & September. | 4,000 | 4 50 | .... | .... | |
| 1859 | Vincennes | Ind. | 25,000 | 100 | — | January & July. | 2,000 | 4 00 | .... | .... | |
| 1858 | Walden | N. Y. | 2,500 | — | — | Private Works. | 1,000 | 6 00 | .... | .... | |
| 1853 | Waltham | Mass. | 100,000 | 100 | 4 | January & July. | 3,000 | 4 00 | .... | .... | |
| 1857 | Ware | Mass. | 30,000 | 20 | — | Do. | 3,500 | 4 00 | .... | .... | |
| 1861 | Warren | O. | 30,000 | 50 | — | Do. | 4,000 | 3 00 | .... | .... | |
| 1854 | Warren | R. I. | 20,000 | 25 | — | Do. | 3,000 | 4 00 | .... | .... | |
| 1855 | Washington | D. C. | 500,000 | 20 | 5 | Do. | 50,000 | 3 25 | 150 | 148 | |
| 1859 | Washington | N. C. | 15,000 | 100 | — | April & October. | 1,500 | 6 00 | .... | ... | |
| 1848 | Washington | Pa. | 20,000 | 25 | 4 | January & July. | 4,000 | 3 00 | .... | .... | |
| 1854 | Waterbury | Ct. | 100,000 | 25 | — | Do. | 4,000 | 4 00 | .... | .... | |
| 1852 | Waterford | N. Y. | 12,000 | 25 | — | Do. | 4,000 | 4 00 | .... | .... | |
| 1852 | Watertown | N. Y. | 20,000 | 100 | — | Do. | 10,000 | 7 00 | .... | .... | |
| 1856 | Watertown | Wis. | 25,000 | 100 | — | Do. | 5,000 | 5 00 | .... | .... | |
| 1858 | Wautoma | Wis. | 30,000 | 50 | — | Do. | 3,000 | 4 50 | .... | .... | |
| 1857 | Waverly | Miss. | 20,000 | 100 | — | April & October. | 4,000 | 5 00 | .... | .... | |
| 1854 | West Cambridge | Mass. | 60,000 | 100 | — | February & August. | 10,000 | 4 00 | .... | .... | |
| 1852 | Westchester | Pa. | 100,000 | 25 | 2½ | Do. | 3,500 | 3 50 | .... | .... | |
| | Westfield | Mass. | 25.000 | 100 | 6 | Do. | 4,000 | 4 00 | .... | .... | |
| | Weston | O. | 20,000 | 25 | — | Do. | | 5 00 | .... | .... | |
| 1857 | West Point | N. Y. | 50,000 | — | — | United States Military | Academy. | 2 00 | .... | .... | |
| 1853 | West Troy | N. Y. | 100,000 | 50 | 3 | January & July. | 10,000 | 3 60 | 85 | .... | |
| 1850 | Wheeling | Va. | 75,000 | 25 | 6 | Do. | 12,000 | 2 70 | .... | .... | |
| | White Plains | N. Y. | 20,000 | 20 | — | Do. | | | .... | .... | |
| 1856 | Wilkesbarre | Pa. | 50,000 | 50 | — | May & November. | 4,000 | 3 33 | 100 | 80 | |
| 1850 | Williamsburg | N. Y. | 1,000,000 | 50 | 5 | January & July. | 60,000 | 3 00 | .... | .... | |
| 1858 | Williamsburg | Va. | 30,000 | 25 | — | Do. | 3,000 | 4 00 | .... | .... | Camp-fires of the Union Army light up this place at present. |
| 1857 | Williamsport | Pa. | 70,000 | 25 | 4 | Do. | 3,500 | 3 80 | .... | .... | |
| 1859 | Willimantic | Ct. | 12,000 | — | — | Do. | 2,500 | 3 50 | .... | .... | |
| 1853 | Wilmington | N. C. | 60,000 | 50 | 5 | Do. | 8,000 | 5 00 | .... | .... | |
| 1852 | Wilmington | Del. | 200,000 | 50 | 5 | February & August. | 20,000 | 3 00 | .... | .... | |
| 1854 | Winchester | Va. | 36,000 | 50 | 6 | January & July. | 5,000 | 4 00 | .... | .... | |
| | Windsor | Vt. | | | | | | | | | |
| | Woburn | Mass. | 20,000 | — | — | Do. | 3,000 | 4 00 | .... | .... | |
| 1856 | Woodstock | Vt. | 10,000 | 50 | 4 | Do. | 4,000 | 6 00 | .... | .... | |
| 1853 | Woonsocket | R. I. | 82,600 | 100 | 4 | April & October. | 4,000 | 3 50 | .... | .... | |
| 1856 | Wooster | O. | 25,000 | 50 | — | January & July. | 6,000 | 3 00 | .... | .... | |
| 1849 | Worcester | Mass. | 160,000 | 100 | 5 | Do. | 15,000 | 3 50 | .... | .... | |
| 1855 | Xenia | O. | 40,000 | 50 | — | Do. | 3,000 | 4 00 | .... | .... | |
| 1854 | Yonkers | N. Y. | 75,000 | 50 | 3½ | Do. | 6,500 | 4 00 | 102½ | .... | |
| 1849 | York | Pa. | 40,000 | 57 | 3 | June & December. | 10,000 | 3 50 | .... | .... | |
| | Yorkville | S. C. | 20 000 | 25 | — | Do. | 4,000 | 4 00 | .... | .... | |
| 1858 | Ypsilanti | Mich. | 20,000 | 50 | 5 | February & August | 6,000 | 14 00 | .... | .... | |
| 1850 | Yreka | Cal. | 30,000 | 100 | — | Do. | 2,000 | 0 00 | .... | .... | |
| 1848 | Zanesville | O. | 44,600 | 25 | 4 | Do. | 10,000 | 3 50 | .... | .... | |

## GAS-LIGHT COMPANIES IN THE BRITISH PROVINCES OF NORTH AMERICA.

| When Chartered. | Town. | Province | Chartered Capital. | Par Val. per Sh. $ | Semi-An'l Div'd. | Dividends Payable. | Population of Gas District. | Price per 1000 Feet. | Asked pr. cent. | Offered pr. cent. | REMARKS. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1854 | Belleville | C. W. | 33 040 | 100 | 4 | January & July. | 1,200 | 5 00 | .... | .... | |
| 1854 | Brantford | C. W. | 32,000 | 100 | 2½ | Do. | | | .... | .... | |
| | Brockville | C. W. | 50,000 | — | — | Do. | 5,000 | 4 00 | .... | .... | |
| | Chatham | N. B. | 50,000 | — | — | | | | .... | .... | |
| 1854 | Charlotte Town | P. E. I. | 50,000 | 100 | 5 | Do. | 3,000 | 3 50 | .... | .... | |
| 1857 | Cobourg | C. W. | 30,000 | — | — | February & August. | 4,000 | | .... | .... | |
| | Dundas | C. W. | 30,000 | — | — | Do. | 6,000 | 4 00 | .... | .... | |
| | Frederick | N. B. | 50,000 | — | — | Do. | | | .... | .... | |
| 1843 | Halifax | N. S. | 160,000 | 40 | 7 | May. | 30,000 | 3 00 | .... | .... | |
| 1850 | Hamilton | C. W. | 125,000 | 40 | 5 | March & September. | 20,000 | 3 50 | .... | .... | |
| 1848 | Kingston | C. W. | 80,000 | 100 | — | Do. | 6,000 | 3 50 | .... | .... | |
| 1853 | London | C. W. | 100,000 | 20 | 5 | May & November. | 5,000 | 5 00 | .... | .... | |
| 1847 | Montreal | C. E. | 400,000 | 40 | — | March & September. | 110,000 | 2 80 | .... | 113 | Last sale at this figure. |
| 1854 | Ottawa | C. W. | 40,000 | 40 | 5 | Do. | 5,000 | 4 50 | .... | .... | |
| 1859 | Point Levi | C. E. | 25,000 | 25 | — | January & July. | 4,000 | 3 50 | .... | .... | |
| 1859 | Port Hope | C. W. | 28,000 | 20 | 4 | May & November. | 4,500 | 3 50 | .... | .... | |
| 1847 | Quebec | C. E. | 200,000 | 200 | 4 | January & July. | 60,000 | 3 00 | .... | .... | |
| 1848 | Saint Catherine's | C. W. | 80,000 | 20 | — | May & November. | 7,000 | 4 50 | .... | .... | |
| 1859 | Saint Hyacinthe | C. E. | 15,000 | 20 | — | Do. | 4,000 | 4 00 | .... | .... | |
| | Saint John | N. B. | 170,000 | 85 | — | June & December. | 25,000 | 3 50 | 110 | 110 | Sales at this figure. |
| | Saint John's | N. F. | 50,000 | — | 4 | Do. | 30,000 | | .... | .... | |
| 1858 | Sorel | C. E. | 14,000 | 20 | 4 | Do. | 4,000 | 3 00 | .... | .... | |
| 1848 | Toronto | C. W. | 400,000 | 100 | 4 | February & August. | 50,000 | 3 33½ | .... | .... | |

## GAS-LIGHT COMPANIES IN CUBA, MEXICO, SOUTH AMERICA AND NEW ZEALAND.

| When Chartered. | Town. | State. | Chartered Capital. | Par Val. per Sh. $ | Semi-An'l Div'd. | Dividends Payable. | Population of Gas District. | Price per 1000 Feet. | Asked pr. cent. | Offered pr. cent. | REMARKS. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Callao | Chile. | | — | — | January & July. | 20,000 | 7 00 | .... | .... | |
| | Cardenas | Cuba. | 50,000 | — | — | Do. | 180,000 | 5 00 | .... | .... | |
| 1857 | Compania Cubana | Hav'a | 500,000 | 500 | 10 | Do. | | | .... | .... | |
| | Cienfuegos | Cuba. | | — | — | Do. | 12,000 | 5 00 | .... | .... | These four towns are lighted by the Compania Cubana of Havana. |
| | Guanabacoa | Cuba. | | — | — | Do. | 14,000 | 5 50 | .... | .... | |
| | Regla | Cuba. | | — | — | Do. | 10,000 | 5 00 | .... | .... | |
| | Trinidad | Cuba. | | — | — | Do. | 16,000 | 5 00 | .... | .... | |
| | Guyaquil | S. A. | 150,000 | — | — | Do. | 35,000 | | .... | .... | |
| | Havana | Cuba. | 1,250,000 | 500 | 7½ | Do. | 300,000 | 5 00 | .... | .... | |
| | Lima | Peru. | 100,000 | — | — | Do. | 150,000 | | .... | .... | |
| | Maranham (Chartered) | | | — | — | Do. | | | .... | .... | |
| | Matanzas | Cuba. | 50,000 | — | — | Do. | 180,000 | 8 50 | .... | .... | |
| | Mexico City | Mex. | 550,000 | — | — | Do. | | | .... | .... | |
| | Montevideo | S. A. | 500,000 | — | — | Do. | | | .... | .... | |
| | Para (Chartered) | | | — | — | Do. | | | ... | .... | |
| 1854 | Rio de Janeiro | S. A. | 1,200,000 | 500 | 7½ | Do. | 300,000 | 4 00 | .... | .... | |
| | San Iago | Chile. | 500,000 | — | — | Do. | 180,000 | 7 00 | .... | .... | |
| 1857 | Saint Jago de Cuba | Cuba. | 450,000 | 500 | — | Do. | 25 000 | 5 00 | .... | .... | |
| | Valparaiso | Chile. | 500,000 | — | — | Do. | 85,000 | 6 00 | .... | .... | |
| | Vera Cruz | Mex. | 500,000 | — | — | Do. | | | .... | .... | |
| | Ville Clara | Cuba. | 50,000 | — | — | Do. | | | .... | .... | |
| | Auckland | N. Z. | | — | — | | | | .... | .... | |

## REPORTS OF GAS-LIGHT COMPANIES.

### PORTLAND, ME.

The annual meeting of the Portland Gas-Light Company was held in that city a few days ago, E. H. Daveis, Esq, the President, in the chair.

The report of the directors was read and accepted. It is as follows:

At the time of the last annual meeting of the stockholders, the controversy between the city and the company respecting the price of gas for the street lamps and public buildings was pending before referees chosen by the parties, according to the provisions of the company's charter. Their award was afterwards made, establishing the price to be the same as that charged to individual consumers—a decision so just in itself that we believe it meets general approval, while its beneficial effect on the business of the company has not been limited to the mere difference in our receipts from the city that a discrimination in their favor would have caused.

A different decision would have led to similar controversies with other large consumers, whose claims could not be yielded to without an increase of price to the smaller ones, and the latter more numerous class would regard any discrimination as unjust that should seek to impose a higher price on those less able, generally, to pay it. Thus a series of disputes, that would have been injurious to the company, and would finally have resulted in no benefit to any one, has been prevented by the decision of the referees, establishing the rule that one price is to be charged to all alike.

Under it, no increase of the price of gas has yet been found necessary, notwithstanding the large advance in the cost of coal and labor, and the company have thus far paid the Internal Revenue Tax of ten cents per 1,000, without adding it to the gas bills, thus, in effect, reducing the price realized to $2 75 per 1,000, which is very low for this place, as a comparison with the price charged in other cities throughout the country, a list of which can be seen at our office, will readily show.

There has been no extension or alteration of the works of the company of any consequence during the past year. The works are all in a satisfactory condition, and have been carried on without accident or interruption by our engineer, Mr. Barker, to whose constant care and skill we owe it, that with but one gasholder and one exhauster a full supply of light has not been wanting for a single night throughout the year.

The fire apparatus mentioned in our last annual report, connected with the steam-pump, has proved of essential service in saving our buildings at the recent fire that consumed the tar-works on the adjoining lot. Within four minutes after the alarm was given the hose was run out, the connections made, and a powerful stream was playing on the wooden buildings most exposed. Much damage would otherwise have been done before the fire department could get to work. The old buildings consumed have long been a cause of anxiety to the directors, so much so that we made an offer last year to purchase the land, mainly to get rid of them. Since their destruction the risk of fire to our works is regarded as very small.

The office of the company has been removed to a more convenient building, and more central location, without any increase of rent. The removal was a subject of careful deliberation by the directors, as such a change is always attended with inconvenience and expense. A lease for ten years has been taken, at a rent of two hundred dollars per year for three rooms, which, with a sheed for tools, &c., will give all the accommodation the company will probably want for that term.

The whole amount of receipts from sales for the past year is $68,615 70—about three thousand dollars more than last year.

The total consumption of gas is 21,109,339 feet—about one and a half million more than last year.

The number of consumers on June 30th, this year, was 1859, against 1794 last year.

Of new main pipe 156 feet only has been laid during the year, making the whole extent of our mains a little over seventeen miles and a half.

Two street lanterns have been put up, making the whole number 297.

The directors have not yet made the usual purchases of coal for the ensuing year, on account of the high rates of freight and exchange, and the company are in debt for a cargo received last year, the payment for which has been deferred, with the consent of the sellers, until we could remit on more favorable terms. The Treasurer's account, therefore, shows a balance of cash on hand larger than usual, and nearly sufficient, after paying the dividend of four per cent., to pay all our debts, including the taxes for this year.

By order of the directors,

EDWARD H. DAVEIS, President

The report of the Treasurer, Hon. James T. McCobb, was presented and accepted. From it we learn that the receipts from all sources, including a temporary loan of $1,100, were $77,093 72. The disbursements, including the payment of the temporary loan and dividends, amounting to $23,852 50, were $49,265 18. The amount paid U. S. Revenue tax was $1,853 13.

A ballot was then taken for directors for the ensuing year.

| | |
|---|---|
| Whole number of ballots | 1575 |
| Necessary for a choice | 787 |
| Edward H. Daveis had | 1575 |
| Rufus E. Wood | 1575 |
| Lemuel Cobb | 1575 |
| Gharles Holden | 1575 |
| Thomas Cummings | 1494 |
| Ezra Carter, Jr. | 1575 |
| Scattering | 48 |

The above-named gentlemen were declared elected, and the meeting adjourned.

Subsequently, the Board of Directors met and organized by the election of Edward H. Daveis, Esq, President, and Hon. James T. McCobb, Secretary and Treasurer.

## WATER-WORKS OF AMERICA.

### DETROIT, MICH.

*Annual Assessment Report of the Secretary of the Detroit Water-Works.*

OFFICE OF WATER-WORKS,
Detroit, June 30, 1863.

*To the Board of Water Commissioners of the City of Detroit:*

Gentlemen,—The annual assessments of rates to be charged for water for the year, commencing July 1, 1863, have been made, and a recapitulation of the same, together with the statistical facts collected while canvassing the city, are herewith respectfully submitted.

The aggregate amount of the rates assessed is seventy-seven thousand and three dollars, being an increase of twelve thousand eight hundred and seventy-five dollars over last year.

The number of families now supplied with water from the works is seven thousand six hundred and ninety-nine, being an increase over last year of four hundred and twenty-four families, and an increase within the past five years of twelve hundred and twenty-five.

The number of families in the city not supplied with water from the works, most of whom reside in districts through which distributing pipes are not yet extended, is sixteen hundred and eighty-nine.

The whole number of families in the city is nine thousand three hundred and eighty-eight, being an increase over last year of three hundred and fifty-one families, and an increase within the past five years of nine hundred and forty families.

The number of unoccupied buildings in the city at the time the canvass was made was as follows: Twenty-two dwelling, twenty-three stores, two taverns and one brewery. The number of buildings constructing at the same time was as follows: Twenty-two brick, and one hundred and six wood dwellings—total dwellings, one hundred and twenty-eight: thirteen brick stores, and four brick mechanic shops. Total buildings constructing, one hundred and forty-five. Valuation $169,100. The number of vacant dwellings at this time is less than at any time previous for the past ten years, and more than one-half less than at the corresponding time time last year, and the number of dwellings constructing now greatly exceeds the number that were constructing the corresponding time last year.

The unusual large increase in the assessed rates the present year, is mostly owing to an addition of fifteen per cent. to the usual rates, which the Board found it necessary to add temporarily because of the enhanced prices of labor, fuel, and materials of all kinds required in the management and maintenance of the works, which have advanced to the extent that the cost of maintenance the present year will greatly exceed former years. The principle that so indispensable an article of necessity as water should be provided at the least possible cost to the consumers, has always been recognized, and the rates graduated to meet the actual cost of furnishing the same. The price of wood—which has always constituted the principal kind of fuel consumed, and of which about eighteen hundred cords are consumed annually—has advanced one hundred per cent. within the past year. The Board, with the view of ascertaining the most economical kind of fuel to consume, directed an inquiry into the relative value of wood and coal. Ever since the use of steam for power, it has been a question what was the most economical kind of fuel to generate steam. In the early days of steamboats on our lakes, soft wood (basswood) was the only kind used, and while firing, if the firemen came across any hard wood, hickory, beach, &c., it was thrown overboard into the lake. At a later period soft wood was rejected, and coal and hard wood only were used, and all soft wood was thrown out. At present coal is almost exclusively used on steamboats for generating steam. It has hitherto been assumed that "960 pounds bituminous coal were equivalent to one cord of mixed Western wood," and upon this supposition their relative values have been assumed, and the duty of the pumping-engines of these works has been calculated.

For the purpose of ascertaining more satisfactorily the relative value of wood as compared with coal, three separate runs of the engine were made with different kinds of fuel—the fire-grates being properly adjusted for consuming the respective kinds. Brookfield coal being considered the best bituminous coal in this market, was selected for the test. The price of this coal at the present time is eight dollars per ton of 2,000 pounds.

The results of the tests were as follows:

FIRST RUN, WITH HARD WOOD (BEECH).

| | |
|---|---|
| Time run | 14 hours 20 min. |
| Revolutions of engine | 14,834 |
| Gallons of water pumped | 2,803,626 |
| Cords of wood consumed | 4¼ |
| Cost of wood delivered at fire, $3 80 per cord | $17 10 |
| Gallons of water pumped for one cent cost of fuel | 1,639 5-10 |

SECOND RUN, WITH SOFT WOOD (BLACK ASH AND BASSWOOD).

| | |
|---|---|
| Time run | 14 hours 40 min. |
| Revolutions of engine | 15,384 |
| Gallons of water pumped | 2,907,576 |
| Cords of wood consumed | 6 |
| Cost of wood delivered at fire, $2 80 per cord | $16 80 |
| Gallons of water delivered for one cent cost of fuel | 1,730 7-10 |

THIRD RUN, WITH BITUMINOUS COAL (BROOKFIELD).

| | |
|---|---|
| Time run | 15 hours 10 min. |
| Revolutions of engine | 15,481 |
| Gallons of water pumped | 2,925,909 |
| Pounds of coal consumed | 6,600 |
| Cost of coal, at $6 00 per ton | $19 80 |
| Gallons of water pumped for one cent cost of fuel | 1,477 7-10 |
| Gallons of water delivered per cord of hard wood | 623,028 |
| Gallons of water delivered per cord of soft wood | 484,596 |
| Gallons of water delivered per 1,000 lbs. coal | 443,320 |

The foregoing tests show the relative value of wood and coal to be as follows:

| | |
|---|---|
| One cord of beech wood is equivalent to | 1,405 lbs. coal. |
| One cord of soft wood is equivalent to | 1,093 lbs. coal. |

And—

| | | | | | |
|---|---|---|---|---|---|
| Soft wood, at $2 80 per cord, is equivalent to coal at | | | | $5 13 | per ton. |
| Beech wood, at 3 80 | " | | " | 5 41 | " |
| " 4 00 | " | | " | 5 69 | " |

The number of families in the city supplied with water from the works and increase from year to year; the number of families not supplied with water from the works; the whole number of families in the city, and the increase from year to year for the past eleven years, and the amount of pipe added, each year, are as follows:

| Years. | No. of families supplied with water. | Increase. | No. of families not supplied. | No. of families in the city. | Increase. | Amount of pipe laid. |
|---|---|---|---|---|---|---|
| 1853 ..... | 4,283 | .... | 1,045 | 5,328 | ..... | 7 miles 2,163 feet. |
| 1854 ..... | 4,619 | 336 | 1,134 | 5,753 | 425 | 13 " 2,071 " |
| 1855 ..... | 5 282 | 663 | 1,045 | 6,326 | 573 | 2 " 2,825 " |
| 1856 ..... | 5,706 | 424 | 1,017 | 6,713 | 387 | 6 " 1,715 " |
| 1857* ..... | 6,189 | 483 | 1,843 | 8,032 | 1,319 | 2 " 1,948 " |
| 1858 ..... | 6,474 | 285 | 1,974 | 8,448 | 416 | 9 " 546 " |
| 1859 ..... | 6,794 | 320 | 1,978 | 8,767 | 339 | 3 " 192 " |
| 1860 ..... | 6,950 | 156 | 2 083 | 8,078 | 206 | 3 " 4,804 " |
| 1861 ..... | 7,128 | 178 | 1,883 | 9,011 | 88 | 1 " 5,045 " |
| 1862 ..... | 7,275 | 147 | 1,816 | 9,087 | 26 | 2 " 1,307 " |
| 1863 ..... | 7,699 | 424 | 1,689 | 9,388 | 351 | |

* Two new wards were added to the city this year.

ASSESSED AND RATED.

| | 1st Ward. | 2d Ward. | 3d Ward. | 4th Ward. | 5th Ward. | 6th Ward. | 7th Ward. | 8th Ward. | 9th Ward. | 10th Ward. | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Amount of Assesment | 9,234 | 7,653 | 7,220 | 8,712 | 9,155 | 10,084 | 10,051 | 7,755 | 3,726 | 2,876 | 77,003 |
| Number of Families | 692 | 620 | 636 | 995 | 1,112 | 1,155 | 1,265 | 978 | 348 | 803 | 7,699 |
| Stores | 38 | 204 | 55 | 4 | 47 | 37 | 4 | 6 | 4 | ..... | 399 |
| Taverns | 14 | 10 | 9 | ..... | 7 | 2 | ..... | 2 | 2 | ..... | 46 |
| Groceries and Provision Stores | 45 | 40 | 48 | 30 | 37 | 33 | 50 | 56 | 27 | 17 | 383 |
| Offices | 18 | 232 | 11 | 2 | 18 | 12 | ..... | ..... | ..... | ..... | 293 |
| Mechanic Shops | 57 | 181 | 100 | 46 | 88 | 64 | 57 | 26 | 9 | 8 | 636 |
| Iron Machine Shops | 4 | 1 | 3 | 3 | ..... | ..... | ..... | ..... | ..... | ..... | 11 |
| Iron Foundries | 3 | 1 | 3 | 2 | ..... | ..... | ..... | ..... | ..... | ..... | 9 |
| Boiler Manufactories | 3 | ..... | ..... | 2 | ..... | ..... | ..... | ..... | ..... | ..... | 5 |
| Locomotive Works | 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 |
| Brass Foundries | 3 | 1 | 1 | ..... | ..... | ..... | 1 | ..... | ..... | ..... | 6 |
| Steam Planing, Door, Sash, Blind and Furniture Manfts | 2 | ..... | 1 | 1 | 2 | 1 | ..... | 1 | 1 | ..... | 9 |
| Saw Manufactories | ..... | ..... | 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 |
| Flour Mills | 1 | 1 | ..... | 2 | 1 | 1 | ..... | ..... | ..... | ..... | 6 |
| Plaster Mills | ..... | ..... | 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 |
| Tanneries and Morrocco Factories | ..... | ..... | 1 | 1 | ..... | 3 | 5 | 2 | 1 | ..... | 13 |
| Steam Tobacco Factories | 2 | 3 | 2 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 7 |
| Soap and Candle Factories and asheries | ..... | 1 | 1 | 2 | 2 | 4 | 1 | ..... | 2 | ..... | 13 |
| Stone and Marble Works | ..... | 2 | 1 | ..... | ..... | 3 | ..... | ..... | ..... | ..... | 6 |
| Railroad Depots | 2 | ..... | 2 | 1 | ..... | ..... | ..... | ..... | ..... | ..... | 5 |
| Livery and Omibus Stables | 4 | 5 | 2 | 1 | 1 | 3 | ..... | 2 | ..... | ..... | 18 |
| Breweries | 2 | 1 | 1 | 2 | ..... | 4 | 9 | 5 | 1 | 3 | 28 |
| Malt Houses | 2 | 2 | ..... | 1 | ..... | 1 | ..... | 1 | ..... | ..... | 7 |
| Bakeries | 4 | 2 | 4 | 6 | 2 | 4 | 3 | 2 | ..... | ..... | 27 |
| Dye Houses | ..... | 2 | 1 | 2 | ..... | ..... | ..... | ..... | ..... | 1 | 6 |
| Gas Works | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | ..... | ..... | 1 |
| Pump Manufacturing and Log Boring Establishments | ..... | ..... | ..... | ..... | ..... | ..... | 1 | ..... | ..... | ..... | 1 |
| Printing Establishments | ..... | 8 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 8 |
| Public Halls | 1 | 4 | 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 6 |
| Churches | 6 | 7 | 5 | 4 | 4 | 3 | 5 | 2 | 1 | ..... | 37 |
| Banks | ..... | 5 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 5 |
| Theatres | ..... | ..... | 2 | ..... | ..... | 1 | ..... | ..... | ..... | ..... | 3 |
| Jail | ..... | ..... | 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 |
| Orphans' Home | ..... | 1 | 1 | 1 | 1 | ..... | ..... | ..... | ..... | 1 | 5 |
| Hospitals | ..... | ..... | ..... | 1 | ..... | ..... | ..... | ..... | ..... | 1 | 2 |
| Public Schools | 1 | ..... | 1 | 3 | 13 | 15 | 10 | 11 | 4 | ..... | 58 |
| Private Schools | 2 | 4 | 2 | ..... | 4 | 3 | 3 | 2 | 1 | ..... | 21 |
| Fire Engine Houses | 1 | ..... | 2 | ..... | 1 | 1 | ..... | 1 | 1 | ..... | 7 |
| Public Markets | ..... | 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 |
| Private Meat Shops | 10 | 2 | 6 | 7 | 10 | 8 | 15 | 6 | 5 | 5 | 74 |
| Stationary Steam Engines | 12 | 11 | 9 | 8 | 7 | 3 | 5 | 2 | 3 | 2 | 62 |
| Piano Forte and Melodeon and Organ Manufactories | ..... | ..... | ..... | ..... | ..... | 1 | 1 | ..... | ..... | ..... | 2 |
| Public Bathing Establishments | 1 | 2 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 3 |
| Rectifying Distilleries | 4 | 3 | ..... | ..... | 1 | 1 | 1 | 1 | ..... | ..... | 11 |
| Vinegar Factories | 4 | 4 | 1 | 1 | ..... | ..... | 1 | 1 | ..... | ..... | 12 |
| Brush and Broom Factories | ..... | ..... | ..... | ..... | 2 | 1 | ..... | ..... | ..... | 1 | 4 |
| Boarding Houses | 36 | 15 | 22 | 12 | 9 | 7 | 7 | 5 | 2 | 6 | 121 |
| Bars for Retail of Spirituous Liquors, Wines and Beer | 71 | 55 | 69 | 59 | 40 | 30 | 75 | 50 | 22 | 20 | 491 |
| Rail Car Manufactories | 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | 2 |
| Last Manufactories | ..... | 1 | 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 2 |
| File Manufactories | ..... | ..... | ..... | 1 | ..... | 1 | ..... | ..... | ..... | ..... | 2 |
| Lime Kiln | ..... | ..... | ..... | ..... | ..... | ..... | 1 | ..... | ..... | ..... | 1 |
| R. R. Cattle Yards | ..... | ..... | ..... | 1 | ..... | ..... | ..... | ..... | 1 | ..... | 2 |
| Cutlery and Edge Tool Manufactories | ..... | ..... | 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 |
| Packing Houses | ..... | 6 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 6 |
| Pottery | ..... | ..... | ..... | 1 | ..... | ..... | ..... | ..... | 1 | ..... | 2 |
| House of Correction | ..... | ..... | ..... | ..... | ..... | 1 | ..... | ..... | ..... | ..... | 1 |
| Coal Yards | 1 | 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 2 |
| Tub and Pail Factory | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | ..... | 1 |
| Chemical Laboratory | ..... | ..... | ..... | ..... | 1 | ..... | ..... | ..... | ..... | ..... | 1 |
| Saw Mills | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | 1 |
| Wheat Elevators | ..... | 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 |
| Home of the Friendless | ..... | ..... | ..... | ..... | ..... | 1 | ..... | ..... | ..... | ..... | 1 |

NOT SUPPLIED.

| | 1st Ward. | 2d Ward. | 3d Ward. | 4th Ward. | 5th Ward. | 6th Ward. | 7th Ward. | 8th Ward. | 9th Ward. | 10th Ward. | Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Families | 16 | 7 | 5 | 39 | 26 | 442 | 88 | 159 | 385 | 531 | 1,689 |
| Stores | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 3 | ..... | 3 |
| Grocery and Provision Stores | 3 | 3 | ..... | ..... | ..... | 3 | 4 | 6 | 8 | 10 | 38 |
| Offices | 3 | 5 | ..... | 1 | ..... | 1 | ..... | ..... | ..... | ..... | 10 |
| Mechanic Shops | 10 | 16 | 8 | 4 | 20 | 4 | 16 | 2 | 10 | 14 | 104 |
| Iron Machine Shops | ..... | ..... | ..... | ..... | ..... | ..... | 1 | ..... | ..... | 2 | 3 |
| Iron Foundries | ..... | ..... | ..... | ..... | ..... | ..... | 1 | ..... | 1 | 1 | 3 |
| Boiler Manufactories | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | 1 |
| Brass Foundries | 1 | 2 | ..... | ..... | 1 | ..... | ..... | ..... | ..... | ..... | 4 |
| Steam Planing, Door, Sash, Blind and Furniture Manfact's | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | 1 |
| Saw Mills | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 5 | 4 | 9 |
| Tanneries and Morocco Factories | ..... | 1 | ..... | ..... | ..... | ..... | 1 | 2 | 2 | 2 | 8 |
| Stone and Marble Works | 3 | 2 | ..... | ..... | ..... | ..... | ..... | 1 | ..... | ..... | 6 |
| Potteries | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | 1 |
| Lime Kilns | ..... | ..... | ..... | ..... | ..... | ..... | 9 | ..... | ..... | 2 | 11 |
| Breweries | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | ..... | 2 | 3 |
| Malt Houses | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 2 | 2 |
| Private Meat Shops | ..... | ..... | ..... | ..... | ..... | 4 | ..... | 2 | 2 | 2 | 10 |
| Forwarding Houses | 17 | 8 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 25 |
| Wheat Elevators | 3 | ..... | ..... | 1 | ..... | ..... | ..... | ..... | ..... | ..... | 4 |
| Stationary Steam Engines | 4 | 1 | ..... | 1 | ..... | ..... | 7 | 1 | 9 | 9 | 32 |
| Rope Walks | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | ..... | ..... | 1 |
| Bars for Retail of Spirituous Liquors, Wines and Beer | 6 | 4 | 2 | 4 | ..... | 3 | 2 | 8 | 10 | 11 | 50 |
| Coal Yards | 2 | 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 3 |
| Glue Factories | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | 1 |
| Ship Yards | ..... | ..... | ..... | ..... | ..... | ..... | 4 | 1 | 1 | 1 | 7 |
| Dry Docks | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | 1 |
| Railroad Depot | 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 |
| Bakery | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | ..... | 1 |
| R. R. Cattle Yards | 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 |

The whole number of families now supplied and not supplied with water from the works, residing in the several wards of each collection district, and the increase and decrease in one year.

WESTERN DISTRICT.

| Wards. | Supplied with water. | Not supplied. | Total. | Increase in one year. |
|---|---|---|---|---|
| First | 692 | 16 | 708 | inc. 34 |
| Second | 220 | 7 | 227 | inc. 28 |
| Fifth | 1,112 | 26 | 1,138 | inc. 55 |
| Eighth | 973 | 150 | 1,123 | inc. 33 |
| Ninth | 348 | 385 | 733 | inc. 38 |
| Totals | 3,345 | 584 | 3,929 | inc. 188 |

EASTERN DISTRICT.

| Wards. | Supplied with water. | Not supplied. | Total. | Increase and decrease in one year. |
|---|---|---|---|---|
| Third | 636 | 5 | 641 | dec. 35* |
| Fourth | 995 | 39 | 1,034 | inc. 18 |
| Sixth | 1,155 | 442 | 1,597 | inc. 77 |
| Seventh | 1,265 | 88 | 1,353 | inc. 26 |
| Tenth | 303 | 531 | 834 | inc. 77 |
| Totals | 4,354 | 1,105 | 5,459 | inc. 163 |

* The decrease of families in this Ward was produced by the burning of tenement houses at the riot which took place on the 6th of March last.

STATISTICS OF THE CITY OF DETROIT, JULY 1, 1863.

| | |
|---|---|
| Number of families | 9,788 |
| Stores | 402 |
| Grocery and provision stores | 421 |
| Offices | 303 |
| Taverns | 46 |
| Boarding houses | 121 |
| Mechanic shops | 740 |
| Iron machine shops | 14 |
| Iron foundries | 12 |
| Brass " | 10 |
| Locomotive works | 1 |
| Boiler manufactories | 6 |
| Steam planing, door, sash, blind and furniture manufactories | 10 |
| Saw manufactories | 1 |
| Tanneries and morocco factories | 21 |
| Steam tobacco factories | 7 |
| Soap and candle factories and asheries | 13 |
| Piano-forte and melodeon factories | 2 |
| Brush and broom factories | 4 |
| Solar compass and mathematical instrument manufactory | 1 |
| Cutlery and edge tool manufactory | 1 |
| Rail car manufactories | 2 |
| File manufactories | 2 |
| Pump manufactory and log boring | 2 |
| Steam match factory | 1 |
| Tub and pail factories | 2 |
| Glue factory | 1 |
| Last factories | 3 |
| Rope walk | 1 |
| Flour mills | 6 |
| Saw mills | 10 |
| Plaster mill | 1 |
| Stationary steam-engines | 94 |
| Wheat elevators | 5 |
| Forwarding houses | 25 |
| Breweries | 31 |
| Malt houses | 9 |
| Rectifying distilleries | 11 |
| Bars for the retail of spirituous liquors, wine and beer | 546 |
| Vinegar factories | 12 |
| Dye houses | 6 |
| Potteries | 3 |
| Packing houses | 6 |
| Bakeries | 27 |
| Public market | 1 |
| Private meat shops | 84 |
| Public bathing establishments | 3 |
| Printing establishments | 8 |
| Stone and marble works | 12 |
| Stone yards and lime-kilns | 12 |
| Public schools | 58 |
| Private schools | 21 |
| Public halls | 6 |
| Churches | 37 |
| Banks | 5 |
| Theatres | 3 |
| Jail | 1 |
| House of correction | 1 |
| Hospitals | 2 |
| Gas works | 1 |
| Hydraulic works | 1 |
| Railroad depots | 5 |
| Livery and omnibus stables | 18 |
| Railroad cattle yards | 3 |
| Fire engine houses | 7 |
| Coal yards | 5 |
| Ship yards | 7 |
| Dry Dock | 1 |
| Chemical laboratory | 1 |
| Orphans' homes | 5 |
| Home of the friendless | 1 |

Respectfully submitted,

ROBERT E. ROBERTS,

*Secretary.*

## WATER-WORKS OF SOUTH ESSEX, ENGLAND.

The chalk-pits of Grays, where the works are erected, and which were recently opened, are situated about a mile from the Thames; they cover an area of nearly 60 acres, and are filled with water-springs, which are so prolific, and are perpetually rising in such large volumes as to produce a million gallons per day. The company have now completed their high service works, and have laid on the water to Brentwood and Warley; in the course of time an abundant supply of water will be furnished to the towns in the upper part of the county, and ultimately to the eastern suburbs of London. At present five pumps are employed, and the quantity of water obtained every 24 hours is 2,100,000 gallons. The steam-engine employed for raising the water from the chalk-pit to the reservoir at Warley, is constructed upon the principle known as Woolf's double-cylinder, and is the most economical and convenient agent that can be employed for this purpose. The steam is first used at high-pressure in the small cylinder, where it is allowed to exert its full power throughout the entire stroke; from this it passes into a larger cylinder four times the capacity of the small one, so that it is expanded to four times its first bulk, and, consequently, its final pressure is reduced in a like proportion; it then passes into the condenser beneath the cylinders, where it is again converted into water, and in this process a vacuum is formed which draws down the piston on the large cylinder, and then the whole power of the steam is made available. The water is raised by a pump, which is worked by a rod direct from the wrought-iron beam of the engine. The pump is double-acting, having both a bucket and plunger, and thus represents a combination of the common lift pump, with a force-pump similar to that used for feeding boilers. The bucket is twice the area of the plunger, and the consequence of this is—that it draws at the up-stroke the full contents of the barrel, but only discharges one-half into the delivery-pipe, the other half being displaced by the plunger at the down-stroke. This causes a pretty uniform flow of water, and enables it to be forced, with the assistance of a large air-vessel, straight into the main, without the intervention of a stand-pipe. It is believed that this is the only instance of water being raised to a height of 400 feet through a main 9½ miles in length. With regard to the source of the water, it issues from the chalk formation out of vertical fissures which have been formed by some upheaving of the strata, and which takes one general direction. To obtain water, all that is to be done is to cut across these fissures, each of which is separate from the other. Owing to the operations which have taken place in working these chalk-pits, very little tunnelling is required. The tunnel in use at present is 25 feet and 5 feet broad, and this can be extended to indefinite proportions according to requirement.

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THE

# AMERICAN GAS-LIGHT JOURNAL,

PUBLISHED ON 1ST AND 15TH OF EVERY MONTH.

C. ELTON BUCK, . . . . . EDITOR.

SATURDAY, AUGUST 1, 1863.

While the last number of the JOURNAL was in press, the city of New York was disgraced by one of the most dastardly riots which the annals of history have ever revealed. Bursting suddenly upon the astonished vision of the community, an avalanche of vile wretches was launched upon the city, and for a while it seemed as if pandemonium had broken loose, and an army of demons invaded our streets. Under the bare, flimsy pretext of repugnance to the draft, a few ruffians started the disturbance. These were soon joined by professional thieves and pickpockets; and in a short time a band of marauders were congregated who ruled with unlimited power for the space of a few days. Law and order were entirely subverted. Arson, rapine, and murder ruled supreme, and for the time the mob reigned with absolute sway—neither life nor property was safe. The persecution of poor, defenceless negroes, and the horrible death to which some of these poor creatures were consigned, stand forth as a shocking spectacle—evincing a barbarity on the part of the actors, which only Sepoys or Indian savages could have imitated.

That the riots were instigated by the enforcement of the conscription act, is false—else why has the draft been proceeded with so quietly in other cities? It is true that the poor dupes who oirginated the reign of terror were set upon by certain well-known demagogues—peace men, so called—and who plied their devilish arts so successfully as to work up the excitable natures of the poor wretches who participated in the outbreak, and hounded them on to their riotous demonstrations. A mob such as that which ruled this city two weeks ago could not have been organized without leaders; and leaders it had. Unfortunately there are scoundrels in this city who possess political power almost unbounded. These men, whom HENRY WARD BEECHER recently so aptly described in England, as "political and social outcasts," knew more about the origin of the disastrous occurrence than they choose to tell. Having fomented the riots, and incited the mob on to their work of ruin, they had shrewdness enough to keep out of harm's way; while they made catspaws of their deluded followers, many of whom were killed in their vain attempt to overthrow the government of the city.

In the onward march of arson and pillage, the gas-works of the city were not forgotten. The laborers there were compelled to desist from work, or as an alternative the buildings would have been burned down. Indeed, this was repeatedly threatened, and many citizens expressed apprehensions of the gravest kind lest their only source of artificial light would be cut off. The workmen at the several gas-houses having been compelled to stop their operations for more than two days, it may be imagined that the supply of gas in the holders ran down very low. With commendable forethought, JOSEPH A. SABBATON, Esq., the engineer of the Manhattan Gas Light Company, issued a note to the editors of the daily papers, requesting them to enjoin on their readers the importance of strict economy in the use of gas until the emergency should be passed. Fortunately the riotors did not carry out their threat of burning the gas-works: had they done so, the effect would have been calamitous indeed. The streets would have been in perfect darkness, and wild bands of marauders could have roved about, and the reign of pillage and assassination would have been complete.

Fortunately, at this time the city is well guarded. In addition to the regular police force, who did their duty most nobly, we now have our tried militia regiments, who, when mob-law was promulgated, were at the seat of war. Their return and the return of quiet were simultaneous. Let us hope that the reign of terror is ended and that law and order have permanently resumed their sway—never to be supplanted for a single moment. Years will roll away before the city of New York will escape the dark disgrace which the late riots have entailed upon her. Let her citizens see to it that through no fault of theirs the accursed thing be repeated.

## THE GAS TAX.

In another part of this paper we reprint from a Cincinnati journal a remonstrance against the gas company of that city for charging the war tax to their consumers. Those of our readers who have observed our record on this subject, will bear in mind how we opposed the act of certain companies in shifting this burden from their own shoulders to those of their consumers. Although our remarks were general in their intent, they applied particularly to the two old established gas companies of this city—the New York and Manhattan. We have seen no reason to change our views since then, and the simple fact that nearly all the gas companies in the country have assumed this tax, proves to us that we were right in the views we embraced, and for which we combatted in the face of much bitter opposition. Advocating, as we have ever done, the best interests of the gas companies, we deemed it the veriest folly for them to widen the breach already existing between them and their consumers, and we added our warning voice in full assurance of the magnitude of the issues involved. The result is briefly told. Many companies who had notified their consumers that they would be subjected to an additional charge to cover the excise tax on gas, suddenly backed down from their untenable position, and wisely concluded to pay the tax themselves. This course was taken from motives of policy alone; and as the only true policy for gas companies to pursue seems to consist in their conciliating their consumers in so far as is consistent with reason, we pronounced the action of these companies at the time to be the only proper course for them to follow.

We should think that the same motives of policy would be apparent to the directors of the Cincinnati Gas Company. But, perhaps they know their own business best, and as circumstances alter cases, so there may be urgent reasons why they prefer to cast the burden of the tax on their consumers.

One argument made use of in the article we have copied from the *Union*, will hardly stand alone. We quote:

"If Congress intended this tax to have been paid by the consumers of gas, it would have made the rate of tax uniform. But, intending to make the gas companies pay the tax, it was assessed on the right principle of a sliding scale, the highest rate of tax upon the largest manufacturer, who makes the largest profits; and the lowest rate upon the smallest manufacturer, who makes the least profits."

In reply to this it may be said that, in the first place, the Excise Law gives permission to gas companies to charge the tax to their consumers, if they feel so inclined.

In the second place, the sliding scale might have been resorted to with great propriety, even if it had been the intention of Congress to compel the consumer to pay the tax. It is very well known that consumers of companies which make a sufficient quantity of gas to be assessed fifteen cents per thousand feet, pay a much lower rate for gas than the consumer of a company making so small a quantity as to be assessed but five cents per thousand. It was probably with a view to equalize this difference, as much as any other, that the sliding scale was adopted. It works well both ways. If the large city companies assume the tax, as most of them have done, it is well known that they are amply able to pay even the large proportion assessed upon them. If they do not assume it, but throw it on their consumer, the latter, paying not much more than half the price for gas which the consumer of a small company pays, is quite as able to have the fifteen cents added to his bills, as the consumer of the small company is to pay five. The price of gas charged by the large city companies, which are taxed fifteen cents, will average from $2 50 to $3 00 per thousand; while the price charged by the small companies, who are taxed but five cents, will average from $4 00 to $6 00 per thousand feet. It is much more equitable to add fifteen cents to $2 50 or $3 00, and only five cents to $4 00 or $6 00, than it would be to have one uniform rate to be assessed on all alike, and this view may have been entertained by Congress when considering the bill prior to its passage.

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If any of our subscribers have remitted money to us and not received an acknowledgment of the same, they will please notify us at once. When money is received at this office, a receipted bill is always returned by the first mail. We make this explanation, because several letters containing money for subscriptions have been stolen in the Post-Office.

## ANSWERS TO CORRESPONDENTS.

J. S., of N. Y.—*You will find a copy of the work you want in the Astor Library. We know of no other copy in this country.*

A. L. B., of Mass.—*We cannot inform you yet of the present condition of the enterprise, as we have not seen the inventor for a long time. We have, however, heard very flattering reports concerning it, although we place very little reliance on them.*

G. E. T., of Ky.—*Our advertising columns will inform you where to procure the needed articles. We refer you to them.*

P. G., of Pa.—*What would have been considered an exorbitant charge a year or two ago is now thought to be but fair and just. Of course your contract cannot be fulfilled at former rates The advance in all materials since that time has been very great, and you will have to make a new arrangement. That is all that we can advise.*

E. D. F., of Ohio.—*The information you give is duly appreciated. We have procured for you a copy of the pamphlet, which we will send to the address you name.*

J. A., Jr., of Vt.—*The process of burning coal-tar has been repeatedly tried with very little success, although a few engineers still persist in using it. We can hardly form a proper conception of your apparatus without drawings. There may be something novel in it.*

## FINANCIAL.

*New York, Friday Evening, July* 31, 1863.

Since our last remarks on financial matters, another victory has crowned our arms, and Port Hudson, the last remaining stronghold of the rebels on the Mississippi, has surrendered to General BANKS. The great river is now open from its source in Minnesota to its mouth in the Gulf of Mexico, and steamers have already made the trip from Cairo and St. Louis to New Orleans. This is a great event, and its effect on trade will be most exhilarating.

The result of the success of Gen. BANKS has been to still further increase confidence in the future, and to impart a new tone to the stock market. Money has been very abundant, and is easily obtained at low rates, while stocks have advanced, and the whole tone of the market is buoyant. Gold has experienced a still further decline, and the subscriptions to the five-twenty loan are pouring in even faster than ever.

Gas shares do not sympathise with this activity. We have absolutely nothing to report in the way of sales since our last issue. Holders appear to be so well convinced of the value of their shares, that very few of them are offered, and these are generally taken up very quickly and quietly.

The *Richmond County*, N. Y., Gas Company, have declared a cash dividend of 15 per cent. on their present capital of $150,000. It is reported that the capital is to be doubled for the purpose of extending the works through the interior of the Staten Island, the old shareholders having the privilege of taking the new stock at par. The first instalment on the scrip is to be 20 per cent.

## THE SANITARY REPORTER.*

A new journal, devoted mainly to the Gas and Water interests, has been lately started in London, the first copy of which we have just received. The *Sanitary Reporter*, which is the name of the paper, is a weekly publication, and if the future numbers evince the same degree of ability as that which characterizes the first issue, it will be a valuable addition to the technical literature of the day. Although chiefly relating to the topics of gas and water works, yet sewerage and social and general science receive a share of attention; and as the importance of these subjects is growing every day, it is well to have some exponent of their principles, and to possess a periodical which will impartially discuss questions of such magnitude.

We are much pleased with the first number of the new paper, which fills a void which should have been occupied long since. It is true that there exists in London, a journal professedly the mouthpiece of the gas and water companies; but this *soi disant* "organ" has been sadly out of tune for some time, and instead of performing its role in a harmonious manner, it has kept up a horrible discord, sufficient to thwart the very purposes for which it was intended. From once occupying the attitude of a representative journal of the engineering profession, it has lately sunk to the ignoble position of being the hack of an insignificant clique, and by its dogged obstinacy and abundant self-conceit, it has managed to alienate the esteem of many of the first gas-engineers in Great Britain. Its pages, too, are dull and heavy, and whatever may be its value as a work of reference, it possesses but little present interest.

The present time, therefore, is a most auspicious one for the new serial to make its appearance. The subjects which it elucidates are of the very highest importance; and, as time rolls on, this importance will be more and more fully developed. England is the home of the sciences which the *Sanitary Reporter* has chosen for its specialities. Whatever may be the claims by which Frenchmen try to arrogate to LE BON the honor of having introduced gas-light, it was MURDOCH who first taught the practicability of the discovery; and to him, therefore, belongs the credit of conferring this great boon on the people all over the world. English engineers have likewise made more rapid advances in hydraulics than those of any other country; while, in the utilization of sewage, and in the cultivation and elucidation of the principles of social science, Englishmen have been conspicuous in all the investigations which have been conducted. It is, therefore, eminently fitting that these important arts and sciences—so closely allied to each other and to the wants of man—should have a fit expositor of their principles in the publication of an English periodical, devoted especially to them. A wide field is open before the new serial, in the occupation of which we heartily wish it unbounded prosperity.

We extend a cordial greeting to the new member of our editorial fraternity, and bid it God-speed in its mission of light, hoping that by ably and fearlessly standing up for the right, and by avoiding the tricks and chicanery of a narrow-minded clan, it may have before it many years of success.

* "*The Sanitary Reporter, a weekly journal relating to sewerage, gas, water, and social and general science.*" *London: published by Edmund Dring, 32 Paternoster Row, E. C., July* 3, 1863.

## CORRESPONDENCE.

### ATMOSPHERIC INFLUENCES.

New York, July 25th, 1863.

*To the Editor of the* AMERICAN GAS-LIGHT JOURNAL:

I have chosen the above title for this article in the full conviction of its inappropriateness—and yet where can a better one be found? My desire is to make some reference to the gradual processes of disintegration and decay which are going on in elevated situations—where atmospheric influences are alone at work—and yet the atmosphere, so far from having anything to do with the work of ruin, acts primarily merely as a vehicle for the conveyance of the deleterious substances to the places where decay is fostered. The atmosphere, in its strict sense, is, as Brande defines it, "the invisible elastic fluid which surrounds the earth to a height variously estimated from 40 to 100 miles from its surface, * * * * the air." This air consists of a mixture of oxygen and nitrogen gases, together with a little carbonic acid, aqueous vapor, &c.; but, save the slowly oxidizing influence with which all are familiar, it possesses, in a state of equilibrium, no deleterious properties, nor can it be charged with effecting a too rapid chemical action by reason of the large proportion of the oxygen it contains.

When the vast amount of fetid exhalations which are constantly thrown out all over the surface of the globe, and the immense volume of impure gases, smoke and vapor vomited forth from countless cities, towns and villages, the noxious fumes given off by manufactories and such establishments, situated all over the world, are taken into consideration, it seems wonderful that the atmosphere should remain in its purity—still unappreciably contaminated by these vast floods of corruption. Yet a chemical examination of the atmosphere of the most densely populated city will reveal but slightly varying results from the examination of the air fresh from rural fields. A slight difference will be shown, and this slight difference is enough, under some circumstances, to work great results, and to produce disturbing influences of great moment.

An example of the silently, but certainly, destructive influences of the impurities held in suspension by the atmosphere may be adduced in the case of the Houses of Parliament of England. It is well known that this immense pile of buildings, which has been the boast and pride of many an Englishman, exhibits symptoms of rapid decay, and that, too, before the work is much more than half finished. This building was planned and intended to remain for centuries, and to be a lasting monument of the period of its construction. But ere it is completed, decay has made its appearance in a formidable manner, and threatens that before long the entire outer wall will crumble and moulder away.

When the difficulty was first noticed, an army of chemists and architects was summoned to the rescue. Each had some scheme to present and some theory to broach concerning the inroads of the deterioration, and many were the remedies proposed and the plans offered to stop the cause of trouble. Paints and washes of divers kinds were proposed, and plasters and coatings were advocated. The authorities who had charge of the matter gave full sweep to the experiments of some of the eminent chemists who had been consulted, and different remedies have been tried, with questionable success. Of course, silicates of potash and soda have largely entered into the composition of the different substances proposed, and these have been put to severe tests; but, so far, I have not learned of any successful results.

The readers of this JOURNAL have heard of Lewis Thompson, Esq., the eminent English gas-chemist. He was consulted among the rest, and to his wise forethought, and to his professional ability, the world is indebted for a true solution of the mystery. The Houses of Parliament are built of brick, encased with magnesian limestone, and the analysis of this stone proves it to have been the poorest material which could have been selected for the purpose. Mr. Thompson, after ascertaining the composition of this stone, and knowing its weak points, which under favorable circumstances were sure to be developed, sagaciously explored the path before him until he detected the cause of the trouble. I say the cause of the trouble—perhaps I should rather say the *primary* cause, for there were two—the peculiar composition of the stone as a building material was one, but the other was the existence of certain atmospheric impurities in the city of London, which are more certain of revealing themselves to the experienced mind of a gas-chemist, than to those of the profession who practice in other specialities. Mr. Thompson made many analyses of the atmosphere of London, and from the results of these analyses he arrived at the solution of the whole mystery, and showed that a chemical action was taking place in the walls of the Houses of Parliament whereby the carbonate of magnesia of the stone was being rapidly decomposed, sulphate of magnesia being formed, which being readily soluble in water is easily washed away, thus causing the stone to assume a porous, friable texture—easily crumbling to pieces.

Mr. Thompson's analyses of the atmosphere of London proved that considerable quantities of sulphate of ammonia exist therein—generated by the numerous coal fires, and being lifted upward on the air and conveyed by this vehicle to the walls where the mischief was and is being worked. The reaction which takes place when sulphate of ammonia and carbonate of magnesia are brought into contact is very simple. The sulphuric acid of the sulphate of ammonia goes to the magnesia, forming sulphate of magnesia, or epsom salts, while the carbonic acid unites with the ammonia. Both of these substances are readily soluble in water, and by the action of the rain, they are soon taken entirely away from the stone. The porous material which is left behind soon crumbles, and the walls of the building present an appearance of having been constructed for ages, instead of having just come fresh from the mason's hands.

The sulphate of ammonia which Mr. Thompson found to pervade the atmosphere of London arises from the innumerable coal fires which pour forth their products of combustion into the air, from the mouths of the myriads of chimneys which the metropolis contains. It is well known that the bituminous and cannel coals which are solely used in London contain large quantities of sulphur, and that during combustion they likewise generate a considerable amount of ammonia. The sulphur, in burning, forms sulphurous acid, to which the air adds one equivalent of oxygen, forming sulphuric acid, which speedily unites with the ammonia, forming sulphate of ammonia, which, in Mr. Thompson's opinion, is the substance which has caused all the trouble.

In this connection, while assenting to Mr. Thompson's opinion, may I not also ask, whether free sulphuric acid may not exist in the atmosphere of London, and whether a portion, at least, of the disintegration of the magnesian limestone, may not be due to the affinity of the free acid? I am aware that the agitation caused by Dr. Lethety's assertion that the sulphuric acid generated during the combustion of coal-gas

was creating such a multitude of evils, was stopped by Mr. Thompson showing that there was sufficient ammonia in the gas to disarm the products of its combustion of all deleterious effects. This is undoubtedly true in regard to gas; but in the free combustion of coal, I am of the opinion that much more sulphuric acid is generated than the ammonia is capable of neutralizing, and of course, in its free state, this acid is much more powerful than when its energies are masked by association with the alkali.

Whatever theory may be adopted, the result shows the powerful chemical agencies at work even in the upper regions of air, where few would think of looking for them. May not the same causes be silently operating in our own city? How soon the marble fronts of our elegant stores and other buildings lose that purity and sharpness of outline which were so conspicuous at first. Atmospheric influences are undoubtedly at work there; but as the exact rationale of the disfigurement has not been investigated, it would be improper just now to express an opinion as to the cause.

The sulphur existing in coal plays an important part in the economy of the universe. It troubles the gas-engineer, and obliges him to resort to an expensive means to get rid of it. When abstracted by means of certain processes, as you showed in a recent number of your JOURNAL, it is utilized by being converted into sulphuric acid, and thus plays an important part in the industrial arts. When burned with the coal of which it forms a part, it is borne along on the atmosphere, where, as we have seen, it fulfils all the requirements of the laws of affinity as completely as if mingled with the reagents of a chemist's laboratory. It is not only interesting, but instructive, to watch it in its various phases and to note its peculiarities, and with a desire to interest your readers, I have trespassed thus far on your time and patience.

OBSERVER.

## PAPERS ON HYDRAULIC ENGINEERING.

BY SAMUEL M'ELROY, C. E.

### *No. 3.—Pumping Engines.*

[From the Journal of the Franklin Institute.]

(*Continued from page 28.*)

*Practical Duty.*—As it is a matter of record that some Cornish engines at the mines have repeatedly exceeded *at the pumps* the above *full steam* duty of 838,819 foot-pounds, being reported for monthly averages in certain cases at 870,000, 885,000, 914,000, 954,000, 961,000, 1,019,000, 1,075,000, and in the experiments of Mr. Wicksteed, at 1,038,037, for 1.12 lbs. coal, in one trial of 117.6 hours, where the evaporation was 8.524 lbs. of water per pound of coal, it follows as an experimental demonstration that there must be a very positive and important gain by expansion, since none of the boilers of these engines yield above 70 per cent. of the theoretical value of the coal, and there are inevitable losses between the boilers and the pumps, by steam radiation, condensation, friction, &c., and engine and pump friction.

In calculating the duty of the Cornish mining engines for the monthly reports, which have been made for many years past, the total amount of coal in bushels, which has been used, and the total number of pump strokes registered form the basis of the report. The coal weight per bushel has been usually assumed at 94 lbs.; and the total contents of the several pumps, into their different lifts, determine the foot-pounds of water delivered. This process credits the duty account with the item of pump loss of action, but it neglects that of pump friction, the actual lift being taken. It is for the interest of the miners, on their plunger pumps, to keep the former a minimum, and although it cannot be claimed that the calculated duty is a rigidly correct statement, it is fair to assume that these errors in calculation may, in many cases, nearly balance each other. The extraordinary lift of many of the mines, ranging in some cases to 1,265 feet, and generally exceeding 700 feet, facilitates the pump duty, high lifts being more economical than low ones; the greatest delivery being about 1,000 gallons per minute, and the average probably exceeding 300 gallons. The piston load is also heavy, sometimes reaching 18 lbs. per square inch.

Mining engines averaged in this way per year of record have given returns as follows (except that of 1855, which is for one month):

| Year. | No. of Engines. | Average Duty. | Average Duty of best Engines. |
|---|---|---|---|
| 1838 | 61 | 58. | 100.2 |
| 1839 | 52 | 65.4 | 92 6 |
| 1840 | 54 | 64.3 | 97.2 |
| 1841 | 56 | 65.1 | 121.3 |
| 1842 | 49 | 64.0 | 127.9 |
| 1843 | 36 | 71.4 | 114.4 |
| 1855 | 15 | 68.4 | 101.3 |

The figures in the last two columns being millions of foot-pounds per bushel of coal.

On the supposition of a balance of losses in the pumps, the range of duty in the last column is 828,000 to 1,142,000 foot-pounds per pound of coal for a bushel of 112 pounds.

In a special trial of an 80-inch engine at Fowey Consols, for 24 27-60 hours, by the Cornish rule of calculation, and with coal of 94 lbs. per bushel, the duty was 125.095,713 foot-pounds per bushel, or 1,330,800 foot-pounds per pound of coal.

Taylor's 85-inch engine at United Mines, for September, 1842, was reported at 107,000,000 foot-pounds per bushel; the engine using 40 lbs. steam and 1-10 to 1-12 cut-off.

The average duty of these engines, as given by Mr. Wicksteed, in 1859, one for 11 years, and the other for 8 years, for Newcastle coal, is 75,230,528 foot-pounds for the former, and 83,875,376 for the latter.

In the experiments on the East London Cornish Engine, with weighed coal, in 1840, the pump duty was in one case 97,146,268 foot-pounds per bushel of 112 lbs.; the corresponding cylinder duty being 136,127,408 foot-pounds, and for an evaporation of 8.524 lbs. of water per pound of New Castle coal. Boiler pressure 51.7 lbs., cylinder steam 45.7 lbs., steam jacket loss ½ per cent. We have then about 12 per cent. steam loss between the boiler and piston, and 28.6 per cent. between the piston and point of water delivery, being 40.6 in all, while the evaporation is 40 per cent. less than the theoretical standard above assumed.

The average duty of two Cornish engines at this Water-works, also cited in 1859, was for Newcastle coal 95,234,885 foot-pounds, as compared with the above average of the mining engines.

It is also shown in 1840 that while the duty at an expansion of 0.397 of the stroke was 78,535,512, at 0.687 it was 108,198,102, or 37 per cent. better, as applied to an experimental standard of 9.493 lbs. evaporation, in calculating the duty.

Taking the experimental duty of 97,146,268 foot-pounds for 112 lbs. coal, the duty per pound is 867,376 foot-pounds. We have then not only the experimental demonstration of a gain of 37 per cent. between two grades of expansion, but an actual result in pump work, independent of all losses by friction and otherwise, between the boiler and point of water delivery, which exceeds the theoretical duty of one pound of coal in the boiler, at atmospheric pressure and under perfect evaporation, as 867,376 to 838,819. The ratio of gain by expansion chiefly explains this singular result. It is proper, however, to say, that no loss of action is charged to the pump of 9 ft. stroke by 9.168 square feet area, and 108 ft. actual lift, and no addition is made for force-main friction. In a water-works engine of this kind the former probably much exceeds the latter.

It must also be observed that the total engine friction and the loss between the boiler and cylinder are much above the ordinary experimental losses in Cornish engines; 10 per cent. friction, and 5 per cent. steam waste, being much nearer the usual experience, or a total loss in first-class mining engines of 60 to 70 per cent. below theoretical duty, in special trials. The 85-inch engine above mentioned realized 38.7 per cent. in duty.

Experiments on evaporation uniformly show a loss between actual tank measurement and indicator measurement by volumes. In some cases it ranges to 23.5 and 24.3 per cent., as we have observed it; in other cases it has been reported less. This loss combines the ordinary boiler and cylinder wastes by leakage, priming, condensation, radiation, &c., and is therefore in excess always of simple steam waste.

If, then, the evaporation loss is taken at 30 per cent., the water and steam loss at 15 per cent., and the engine friction at 20 per cent., which are moderate rates, it is easy to see how the actual gain by expansion is absorbed, and equally plain how incompatible any high range of duty is with full steam stroke.

We also learn from these examples the prominent rank of the single-acting engine in actual pump duty, in special cases and in a large class, as also for very long periods of time.

The experiments at the East London Water-works, on the Boulton and Watt engine, gave a duty of 42,847,598 foot-pounds per bushel of 112 lbs., or 382,568 foot-pounds per pound of coal. The expansion was 0.367 of the stroke, boiler steam 17.7 lbs.

A double-acting engine at Wheal Vor, is reported for June, 1841, at 61,966,317 foot-pounds; another of same size (36-inch) at Tin Croft, in the same report, gives 36,971,087 foot-pounds.

The double-cylinder engines of the Thames Dilton class, double-acting, are in several cases reported at high ranges of duty.

An experiment on the four Chelsea engines of this class, August, 1857, in which the duty is calculated from the pump contents, and the equivalent head including pump friction, gives 926,400 foot-pounds per pound of coal; the expansion is eight-fold.

Some of the double-acting engines in the United States have been thus reported.

Pittsburgh, 1841, upper service engines 178,050 foot-pounds; lower service engines 170,648 foot-pounds.

Alleghany City, 1841, 171,667 foot-pounds.

Detroit, 1860, No. 2 engine, 341,111 foot-pounds.

Philadelphia, 1858, Spring Garden engines Nos. 1, 2, and 3, 255,000 foot-pounds.

Experiments with the Cincinnati engines, in 1862, to test the economy of a condenser, had the following results, as to this attachment and as to expansion and pressure.

WITHOUT CONDENSER.

| Boiler Steam. | Cut-off. | Duty. |
|---|---|---|
| 90 | ⅜ | 350,633 ft-lbs. |
| 90 | ⅝ | 405,258 " |
| 110 | ⅜ | 404,707 " |

In the first case the cylinders were not clothed. In the second this was done, the feed-water heated, and a damper applied to the chimney. In the third case the feed-water heating arrangement was detached.

WITH CONDENSER.

| Boiler Steam. | Cut-off. | Duty. |
|---|---|---|
| 90 | ⅜ | 354,652 |
| 90 | ½ | 352,880 |
| 90 | ⅝ | 358,885 |
| 80 | ⅜ | 326,231 |
| 40 | ⅝ | 265,685 |
| 115 | ⅜ | 362,789 |
| 90 | ⅝ | 321,975 |
| 110 | ⅜ | 362,239 |

The first trial without cylinder clothings, the next three with clothing and feed-heat, and the last four without the feed-heat. The results showed no advantage in condensing under steam of the ordinary working pressure, and as a running commentary on expansion, give 27 per cent. for a change from ⅜ to ⅝ cut-off, and of 115 to 40 pounds pressure.

The duty of the "Bull" engines at the 24th Ward Works, Philadelphia, in 1862, was 385,450 foot-pounds by Cornish rule. At Buffalo, by experiment in 1852, the duty was 370,000 foot-pounds.

The duty of the Cornish engine at Philadelphia, for 1858, was 465,400 foot-pounds. At Cleveland, for 1862, one engine gave 550,000 and the other 490,000 foot-pounds. On special trial in 1856, the Spring Garden engine (Philadelphia) gave 589,053 foot-pounds.

The pump duty of the Belleville Cornish engine (Jersey City), on special test in 1857, was 680,660 foot-pounds.

The combined cylinder engine at Cambridge, which has about three-fold expansion, on special test, without actual measurement of delivery, gave 551,261 foot-pounds.

The Hartford engine, on special trial in 1856, gave 591,505 foot-pounds, actual pump duty. The annual duty for 1857 was reported at 592,694 foot-pounds.

The Prospect Hill engine, Brooklyn, which is double-

acting, working two pumps from its beam, and connected with a fly-wheel and shaft, under special trial in 1862, gave 649,577 foot-pounds for 93 hours' trial, and 684,042 foot-pounds for 10 hours of this time.

The duty of the No. 1 engine of Brooklyn, tested in 1860, was 611,114 foot-pounds, and of No. 2, tested in 1862, 606,613 foot-pounds.

It is obvious, from these instances, that we have as yet entirely failed to reach either the standard of actual results in the mining engines of the Cornish school, or the results theoretically within reach; and these facts furnish a sufficient comment on the argument presented under each division as to the great need of a more perfect system of design, workmanship, and operation.

If time permitted, it would be a matter of interesting analysis to trace out in the various results above experimentally given, the special causes which have controlled them, and to show how readily they resolve themselves into an argumentative defence of the prominent laws of action we have presented. We have high steam and expansion vitiated by excessive friction, and light friction vitiated by low steam, improper proportion, and defective expansion; some bad quality or other, constantly counteracting the good ones; pumps badly located, water passages tortuous and contracted, engines overloaded with gearing and frictional resistances or deprived of adequate momentum, and boilers wasting 30, 40, and 50 per cent. of their coal combustion, and a large percentage of their steam. The field of study here is large and of vast consequence; the lines and directions of improvement are plain; the teachings of theory and practice unmistakable.

As a special example in these respects we may take the Prospect Hill rotative engine, and the Ridgewood engine, at Brooklyn.

The former was worked under a boiler pressure of about 45 lbs. steam, with about 1-7 cut-off. Taking one portion of the trial of 11 hours in comparison with another portion of 10 hours, with 149 lbs. coal per hour, a pump load of 28.78 lbs., a cut-off of 0.35, and boiler steam at 22.5, the revolutions were 1,233 per hour, while with the same coal, a water-load of 28.54 lbs., boiler steam 44.3 lbs., and cut-off 0.145, the revolutions were 1,379, or 11.2 per cent. better. Comparing two observations together of two distinct hours, where the expansion in one case was 0.35, and in the other 0.05, the relative duty of the latter was 58 per cent. better than the former. And yet the engine, as a whole, like all others of its class, was defrauded of any high range of duty by its losses in friction, steam waste, and evaporation.

On the other hand, the Ridgewood engine, which has less than 8 per cent. friction between the piston and pump, and which has never been worked Cornish fashion, and has not now, by a number of tons, its proper counterweight, which works with 18 pounds boiler pressure, and 8 lbs. cylinder steam, cutting-off at 0.4, obtains its duty of 611,000 foot-pounds, under conditions which are manifestly unfavorable to high results, and solely through its perfection of motion. Properly adjusted and operated, there would be no trouble in carrying it up to 1,000,000 foot-pounds duty.

In the latter case, it was proved by a series of gradual improvements in 1859, resulting from increased pressure in the boiler and increased weight on the beam, that the progress towards maximum performance was strictly defined; and the results with the second engine fully confirmed the theory, though vitiated by neglect of its proper development. As an illustration of the effect of increased load, the dotted line of the pump-card, noticed at page 299, vol. xliv, is given. This shows greater smoothness of action and less loss in power, in confirmation of the general theory advanced. The results which will be obtained when these engines are worked under proper expansion, cannot fail to confirm the Cornish experience in this respect; an experience which furnishes the engineering world with a forcible argument on the benefits of carefulness in design and simplicity in operation.

(*To be continued.*)

GAS IN PRUSSIA.—The gas-works of Brandenbourg were inaugurated on the 1st of September last. The company light 375 public lamps, and have to supply about 2,500 burners for private consumers.

## ON DESTRUCTIVE DISTILLATION, CONSIDERED IN REFERENCE TO MODERN INDUSTRIAL ARTS.

BY B. H. PAUL, PH.D.

(*Continued from page* 23.)

Just at the time when Lord Dundonald was carrying out his enterprise of coal distilling, the subject of destructive distillation was treated of by Bishop Watson, in one of his essays. He gives the results obtained by the distillation of pit coal, "with a fire gradually augmented," and describes one portion of the oil he thus obtained from Newcastle coal as being lighter than water, "more or less liquid and transparent, according as the heat used in conducting the distillation has been greater or less."

Another portion of the oil was black, thick, and tenacious, much resembling tar. He also states that "the quality of the liquid separable from wood by distillation is wholly the same as that of the liquid separable from pit coal by the same means."

He also adds that "it is probable that the quantity of oil separable from the same kind of coal by distillation may be influenced in some degree by the manner of performing the operation; and there is, moreover, some reason to believe that in different kinds of coal the quantities may be very various."

This conjecture was soon supported by results of observation. M. Sage, in a paper on coal, published in 1789, describes English cannel coal as yielding "by distillation more than one-third of its weight of oil that solidified in cooling," while the French coal gave only one-sixteenth of its weight of oil. Newcastle coal, though containing "as much bitumen as cannel coal," was described by the same observer as being very different from it, and Scotch coal, which contained much less bitumen than either of the preceding coals, gave by distillation an oil that was liquid and floated on water.

Kirwan, in 1796, stated that almost all species of mineral coal yield on distillation more or less of both species of bitumen—solid and liquid—but that "the proportion is variable in every species, according to the degree of heat applied." Referring to Lord Dundonald's method of obtaining tar from coal, he says: "By his lordship's mode of distillation, however, much seems to be lost during the internal combustion. I should think the Prince of Nassau-Saarbruck's method in this respect more advantageous. M. Sage tells us that by distillation he obtained from cannel coal one-third part of its weight of tar."

It is very interesting to find that Kirwan describes the coal used by Lord Dundonald for distillation as being a kind of cannel coal, similar to, but of a better sort than, the "stony or slaty cannel coal" from Ayrshire. This coal is described as burning like compact cannel coal, without caking, and leaving a stony residuum. It contained 20.83 per cent. of ash.

Proust also, in 1806, described the oils obtainable from coal by distillation: a light oil similar to that of amber, and a heavy oil like tar. He says that "the oily products of coal vary much in consistence, and it is necessary always to make an experiment to ascertain if it will yield thick oil or tar."

Lord Dundonald's method of distilling was carried out also in France by a M. Faujas de Sante Fonds, who claimed to have conceived the same idea of obtaining the volatile products given off in coking, before knowing of Lord Dundonald's plan, although he was confirmed in that idea by visiting the tar works in Scotland. Shortly after his return to France an experiment was made by him, by the order of M. de Calonne, to illustrate the operation, and an account of it is given in a scientific journal of that time.

Just at this time, however, a circumstance took place which exercised a great influence on the development of this young branch of manufacture. The oil manufactured by Lord Dundonald was just beginning to be employed for street lamps, and it is said that he was in treaty with the authorities with a view to the lighting of London by means of it, when a new project was started, viz., the use of gas as a source of light, which eventually proved the overthrow of Lord Dundonald's undertaking.

The chemistry of gases, or pneumatic chemistry, as it was then termed, had, during the latter half of the eighteenth century, gradually absorbed the attention of chemists. As far back as 1721, Hales had, in the course of his experiments on air and its relation to vegetation, observed that Newcastle coal yielded in distillation one-third of its weight of air. In 1739 Mr. Clayton was induced, by the observation of a natural discharge of combustible gas from the neighborhood of a coal pit, to try the effect of heat upon coal, and he found that by distillation he obtained a similar inflammable gas, together with a black oil and some watery liquid. This spirits of coal, as he called it, served him for the amusement of his friends, and for the entertainment of the Royal Society, but for no other purpose. In 1759, Neumann stated in his "Chemistry" that vegetable substances in general, urged hastily by a strong fire, emit an aëreal elastic vapor. Bishop Watson also refers to the inflammable gas produced in distilling coal, &c. He says, "the products obtainable by distillation from bituminous and vegetable substances in general are water, gas, oils of different colors, weights, consistencies, and a black, coaly residuum." It was not, however, until shortly after the year 1790, that a Cornish engineer, Mr. Murdoch, not only observed that the gas given out by heating coal, wood, peat, &c., burnt with a bright luminous flame, but also conceived the idea of using the gas thus produced as a source of light. A somewhat similar idea was about the same time being carried out in France by Le Bon, the material from which gas was obtained being wood.

The announcement of this invention produced a most remarkable effect. Notwithstanding energetic opposition to its introduction, it rapidly gained ground; in 1810, the first gas-light and coke company was formed, and ten years later gas was almost universally used in London.

Attention was thus suddenly diverted to the gaseous products of destructive distillation as a source of light; but the oily products were not wholly forgotten, nor did the nature of the relations existing between them and the gaseous products admit of their being overlooked. Long before any great attention had been directed to the gaseous products of destructive distillation, it had been observed that both the quantity and the quality of the oily products obtained from any given material depended upon the degree of heat employed in the distillation. But when the gas produced in the distillation also became an object of investigation, and when the means of producing it for practical purposes were being developed, it soon became evident that, to a great extent, gas and tar or oil were convertible substances: that whenever a great deal of oil was produced, only a small quantity of gas was obtained. This fact threw a new light upon the nature of destructive distillation, and since it was a most important desideratum, in regard to this new manufacture, to obtain the largest possible quantity of gas, the conditions requisite for effecting this object were specially investigated at a very early period in the history of gas-lighting.

The general result arrived at was, that the production of the largest amount of illuminating gas from coal required the distillation of the coal to be conducted within a certain range of temperature. When the temperature was much below an ordinary red heat, a smaller quantity of gas was conducted than when the distillation was obtained at a full cherry-red heat, and at the same time a larger quantity of the oily product was obtained. On the other hand, when the temperature was much above a full cherry-red heat, the quantity of gas was much increased, but its illuminating quality was very much reduced. Hence a cherry-red heat was fixed upon as the temperature to be employed in practice, because that was the temperature at which the largest quantity of the volatile products were converted into the state of gas of the greatest illuminating power, and at which the smallest quantity of those products remain in the liquid state.

Accordingly, in practical and scientific works, treating of the manufacture of gas and the phenomena of destructive distillation generally, this fact is prominently mentioned. Thus, for instance, Accum says: "The production of carburetted hydrogen, both with regard to quantity and quality, from the same kind of coal, depends much upon the degree of temperature employed in the distillatory process. If the tar and oil

produced during the evolution of the gas in its nascent state be made to come in contact with the sides of the red-hot retort, or, if it be made to pass through an iron cylinder or other vessel heated red-hot, a large portion becomes decomposed into carburetted hydrogen gas and olefiant gas, and thus a much larger quantity of gas is produced than would be obtained without such precaution, from the same quantity of coal." This was rendered still more evident by pointing out that every pound of coal-tar so decomposed produced "15 cubic feet of carburetted hydrogen, abounding in olefiant gas."

Ure, in 1824, describing the theory and practice of the production and use of coal-gas, says: "If coal be put into a cold retort and slowly exposed to heat, its bitumen is merely volatilized in the state of condensible tar; little gas, and that of inferior illuminating power, is produced. This distillatory temperature may be estimated at about 600° or 700° Fahr.

"If the retort be previously brought to a bright cherry-red heat, then the coals, the instant after their introduction, yield a copious supply of good gas, and a moderate quantity of tarry and ammoniacal vapor."

Dumas, in 1828, describing the general features of destructive distillation, says that the nature of the products depends on the temperature employed. "By heating gradually, oil is produced, and at a higher temperature no oil is obtained, because it cannot exist at the higher temperature." Describing the manufacture of gas, he adds that the products obtained from coal by distillation are "coke, tar or oil, and gas." The relative quantities of each of these products are very different, not only according to the different kinds of coal, but still more according to the temperature at which the decomposition is effected. Experience has shown that the quantity of oil or tar, as well as that of coke, is greater when the temperature is low; while these products are formed in less proportion when the temperature is high. The quantity of gas, on the contrary, is greater at a high temperature than at a low temperature, that is to say, the more gas is obtained, the less tar is produced. It is evident, therefore, that during the operation of gas making a suitable temperature must be obtained. If it is too low, a large quantity of tar is obtained and little gas.

Hence it is evident, as I have before remarked, that though attention was directed chiefly to the production of gas, the other product of destructive distillation—viz., the oil—was not forgotten, although it was not the desired object of the manufacture. And though gas had become the chief object of attention as a source of light, the production of oil, by destructive distillation, was not abandoned. So late as 1819 Waterloo Bridge was lighted with coal-oil, and in the same year M. de Saussure published an account of a method of purifying hydrocarbon oil, obtained by the destructive distillation of a bituminous mineral found at Travers, in Neufchatel. That method is identical with those employed at the present time. But it was in 1833 that the first important impulse was given to this manufacture, by the investigations of Reichenbach into the chemical nature of the products obtained by the destructive distillation of organic substances. Up to that time the knowledge of the oily products of destructive distillation, in regard to their chemical nature and the means by which they might be purified, was very slender. It was known that different materials yielded different kinds of oily products, and that the quantity obtainable varied according to the nature of the material and the temperature of the distillation. Neumann described the oil first drawn in the distillation of organic substances by a fire slowly raised, as being commonly fluid and lighter than water, while that which followed at a higher heat was thick and heavy, and forced that out at last by the "greatest vehemence of fire assumed a pitchy substance." Accum described the tar from Newcastle coal as specifically heavier than that produced by cannel coal; hence it sank in water, whereas the latter swam on the surface of water.

The tar obtained in gas-works required to be boiled down to give it a sufficient consistence, and render it fit for use in coating wood. When this process was conducted in close vessels, a portion of oil was obtained that was commonly known as oil of tar, and by carrying on the distillation still further, more oil was obtained and a residue of pitch. The crude tar gave about 25 per cent. of the first-named oil, and by a further distillation about 47 per cent. of pitch. No great use was made of these oils, however, and as is still the practice, gas tar was often boiled down in an open vessel without attempting to collect the oil.

While things stood thus, Reichenbach's first paper appeared. He referred to the oily products of destructive distillation as substances that had hitherto received but little attention from chemists, partly in consequence of their having been rare, and partly because those that were known possessed characters that prevented their being applied to practical purposes; thus, for instance, their use as illuminating materials was prevented by their copious production of smoke when burnt; by their too great inflammability or liability to alteration when exposed to the air, their offensive smell, and several similar obstacles. He therefore considered that a more complete investigation of these products was desirable, and the thorough practical spirit in which he undertook this investigation is apparent throughout his memoirs.

The first substance which he succeeded in obtaining from tar was paraffin. That substance is now too well known to need a repetition of his description of it. I need only mention that he described it as existing in tar in considerable quantities. He pointed out that the application of tar as a material for greasing the axles of cart-wheels depended upon the presence of this substance in tar, and that it was likely to furnish an appropriate material for making candles. He showed, also, that its peculiar chemical stability, under the influence of powerful reagents, was such as to suggest various easy means of extracting it from tar on a manufacturing scale. He then adds: "I have here spoken only of the tar of beach-wood; however, it is not only in this, but also in the tar of pine-wood, that I have ascertained the existence of paraffin, and there is no doubt that it is produced by the distillation of all kinds of wood." Shortly afterwards he obtained paraffin by distilling animal substances. This led him to the conclusion that paraffin is a product of the carbonization of all organic substances, and he then extended his investigation to mineral substances, principally coal. By distilling coal in an iron retort, "commencing the distillation at first with a gentle heat, then gradually raising it, till at last the bottom of the retort was made dull red-hot and then cherry-red," he obtained an oil containing paraffin, and then pronounced paraffin to be a common product of all substances of organic origin.

*(To be continued.)*

## THE GAS TAX—IMPOSITION UPON IMPOSITION.

The Cincinnati Gas Company had bestowed upon it, by the people of this city, the exclusive privilege, or monopoly, to supply gas-lights. Under such considerations, the Gas Company should do what is right towards the people. What is the Gas Company doing now, however? It is charging its customers, in addition to what is well known as a profitable price for gas, the tax which was assessed by Congress for support of the Government and our glorious institutions—a tax which all good and loyal men are willing to pay for such a purpose, but not for the benefit of the Gas Company.

The tax law of Congress says that when a Gas Company manufactures a certain amount of gas, such, for instance, as the amount used in Cincinnati, it shall pay a tax of 15 cents per thousand feet; when a Gas Company manufactures a lesser amount of gas, such, for instance, as the amount used in Cleveland, it shall pay a tax of 10 cents per thousand feet. And when a Gas Company manufactures a still less amount of gas, such, for instance, as the amount used in Hamilton, it shall pay a tax of five cents per thousand feet.

Why did Congress lay on the gas tax in this sliding scale unless the evident and palpable intention of Congress was that the Gas Companies and not the consumers the gas, should pay the tax; that the Gas Company doing the largest business can afford to pay 15 cents tax, while the Gas Company doing the smallest business can afford to pay five cents? It's of no use or value to the citizens of Cincinnati that this Gas Company makes 600,000 feet of gas per diem, while the Gas Company of Hamilton only makes 60,000 feet. Yet the citizens of Cincinnatti must pay a tax of 15 cents, while the citizens of Hamilton would only have to pay a tax of five cents, if it be understood that the tax is to be paid by the consumer of gas.

There is not in the compass of our knowledge another Gas Company, besides the one in our city, which charges its customers with this Government tax. The question of its legality was peremptorily answered in Covington by the refusal of the City Council to pay any such charge; and the Gas Company of Covington, after taking the best legal advice on the point, has ceased to urge its claim on the consumers for payment of the tax, but quietly itself pays the tax monthly to the assessor out of its own profits.

It is claimed by the Gas Company that the act of Congress gives the Gas Company the power to collect the tax from the consumer of gas; but we think the Supreme Court has again and again ruled that no law of Congress, or any other earthly power, can interfere with contracts already made—that no law can be made retrospective. There is a written contract existing between every consumer of gas and the Gas Company, if the consumer has signed his name to the application book in the office of the Gas Company, previous to the tax law of Congress. In all former suits and pursuits of the Gas Company, this has been recognized as a contract, binding the consumer on the one hand to use gas, and pay $2 50 per 1,000 feet, and otherwise observe the rules and regulations of the Gas Company; while, on the other hand, the Gas Company binds itself to the consumers to furnish gas on said terms and regulations.

This is to all intents and purposes a written contract between the parties concerned, and yet the Gas Company, in spite of this contract, adds 15 cents per 1,000 feet to the price stipulated. The people of Cincinnati have been simple enough to pay this tax without resistance, because probably each man is in the habit of meekly paying the gas-bill as presented, not knowing whether it is right or wrong.

If the Gas Company has averaged a sale of 600,000 feet of gas per diem, as may be calculated something near the mark, the amount of this tax bagged by the Gas Company, is ninety ($90) dollars per deim. A nice "raid" upon our people!

If Congress intended this tax to have been paid by the consumers of gas, it would have made the rate of tax uniform.* But, intending to make the Gas Companies pay the tax, it was assessed on the right principle of a sliding scale, the highest rate of tax upon the largest manufacturer, who makes the largest profits, and the lowest rate upon the smallest manufacturer, who makes the least profits. And Congress knew very well it could pass no law to permit Gas Companies to raise the price of gas, which they had contracted to furnish at stipulated prices. Almost all the Gas Companies of the United States have interpreted the tax law in this way. Our City Gas Company is an exception, and we cannot account for it.—*Cincinnati Union.*

* There is no sense or justice in a sliding scale of gas tax, expected or intended to be paid by the consumers.

## PETROLEUM ITEMS.

Rapid Development of the Trade in Petroleum.—From the London *Grocer* we extract the following remarks:

"There is no record in the commercial history of this or any other country in the world of a natural product or an article of manufacture becoming so generally known and appreciated in so short a period as petroleum. When Queen Elizabeth put on the first pair of silk stockings ever worn in England, many years elapsed before they came into general use among her subjects; and long after her death, when, in the year 1610, tea was first brought to Europe by the former Dutch East India Company, and fifty years later (1660) imported into England as an article of luxury and novelty by Lord Arlington and Lord Ossory, who brought over some from Holland, what a time it took to become even generally known in this country; for we find that half a century subsequently (1711), the quantity imported for home consumption was only 141,995 lbs., whilst it has taken another century and a half since then to make it what it has now become—a favorite beverage in general and daily consumption in every house throughout the length and breadth of the kingdom. The same remarks apply equally to coffee, sugar, cocoa, spices, and many other articles no longer considered as luxuries, but rather as necessaries of life, and of general and everyday consumption.

"On the other hand, we have had occasion several

times to point out the wonderfully rapid and unprecedented development of the trade in petroleum, and in our remarks in the *Oil Trade Review* for May we showed the statistical returns for the first quarters of this year and the two previous ones, from which we learn that the export from the United States two years ago was only 60,021 gallons, whilst in the first quarter of the present year it had risen to more than nine millions of gallons, being an increase in two years of *above fifteen thousand per cent.!*"

Directions for using Kerosene Lamps.—The Board of Health of Brussels give the following, among other directions, about the proper care and mode of using kerosene or petroleum lamps:

"The lamp should always be kept hermetically closed, for whenever there is an opening that admits a direct communication between the oil-holding receptacle and the flame the lamp ought not to be used, as an explosion may ensue. The receptacle may contain more petroleum than is sufficient for one burning, and should be made of glass or other transparent material, so that the quantity of liquid in it may be easily ascertained. The foot of the lamp ought to be broad and heavily weighted, so as to give it greater stability, and prevent its being easily upset. Care should be taken, before lighting the lamp, to see that there is a sufficiency of petroleum in the receptacle, and should it, nevertheless, be consumed earlier than expected or required, the flame must be first extinguished, and time allowed for the lamp to cool, before refilling and lighting it again."

The Pennsylvania Oil Region.—At no period since the first great discoveries, has there been so much activity displayed in sinking wells along Oil Creek, and in its immediate vicinity, as at present. At this time, as near as we can estimate, there are between two and three hundred wells now under process of being bored. The successful ones so far are very few, in proportion to the number of wells that have been sunk. Some few have made a strike, such as the Caldwell, Farrell, McKinley, and a few other wells, but the largest proportion have not, thus far, amounted to much. Quite a number of the miners have struck "mud veins," and others have failed to strike the crevice where the oil is contained. Many parties, in view of the number of wells being sunk, decline to purchase heavily at present prices, believing that large discoveries of oil will be made between the present date and fall. It is a fixed fact, that unless large wells are struck, prices will rule high this fall. Knowing this, parties are anxiously awaiting the future development of this valuable but mysterious product. How far this conclusion in regard to buying oil cheap is correct, we are not prepared to state. The only way in which we can approximate to the developments of the future is by a retrospect of the past. Up to the 15th day of May, 1862, there had been sunk immediately along the valley of Oil Creek, from Oil City to the Sherman well, 495 wells. Of these only 75 were flowing wells—many of them small ones. It is but reasonable to suppose that the proportion at this time will not be much greater. There is no certain guaranty, even with the most practical of our miners. If ever there was a complete vindication of the old axiom, that "All signs fail in dry weather," it is in boring a well in search of the oil. The "surface indications" have in a great measure failed entirely. "Spiritual mediums" have been consulted in a number of instances, but, so far as we can learn, have been anything but reliable. Even the gifted individual, with his "magic" divining wisch hazel rod, has failed to point out the exact spot upon which to commence operations with the drill. Yet every man has his own theory, which, if you listen, he will convince you is the only true one. That the oil still exists beneath the rocks of the valley of Oil Creek, in such vast quantities as to be practically exhaustless, we sincerely believe. That it will be obtained in necessary quantities, from time to time, is morally certain. But, so far as we can judge, any one of common practical sagacity stands an equal chance in obtaining the treasure. But we live in the hope that science and human ingenuity will, ere long, make the sinking of a well and the obtaining therefrom a remunerative return, a certainty.—*Oil City Register.*

Petroleum in Surgery.—An assistant surgeon writing from Gettysburg, says: "Will you allow me, as one alleviation of the horrors of the battle-field, to call your attention to the use of coal-oil in suppurating wounds? As volunteer assistant, I received [illegible] from the surgeons of the first division of the Fifth corps, Gettysburg, to use it in the most offensive cases. By its manifest utility, and the solicitations of the wounded, I was induced to enlarge its use, until I became satisfied that what cold water is to a wound, in its inflamed state, coal-oil is to it in its suppurating state, dispelling flies, expelling vermin, sweetening the wound and promoting healthy granulations. It can be used by any assistant of ordinary judgment with perfect safety and to the great comfort of the patient. I have seen two patients, whose wounds have been dressed with it, asleep before I was through with the third."

WEEKLY EXPORTS OF PETROLEUM FROM NEW YORK
During 1863, as compared with 1862.

| | | | | | | |
|---|---|---|---|---|---|---|
| January | 4th, 1863, | 18,546 gals. | | 1862, | 185,781 gals. | |
| " | 11th, " | 20,218 | " | " | 124,953 | " |
| " | 18th, " | 27,380 | " | " | 43,286 | " |
| " | 25th, " | 524,778 | " | " | 21,091 | " |
| February | 1st, " | 745,320 | " | " | 10,784 | " |
| " | 8th, " | 363,428 | " | " | 136,879 | " |
| " | 15th, " | 610,026 | " | " | 163,497 | " |
| " | 22d, " | 871,440 | " | " | 6,435 | " |
| March | 1st, " | 558,367 | " | " | 114,721 | " |
| " | 8th, " | 557,490 | " | " | 25,181 | " |
| " | 15th, " | 281,490 | " | " | 277,655 | " |
| " | 22d, " | 598,783 | " | " | 272,812 | " |
| " | 29th, " | 736,188 | " | " | 181,024 | " |
| April | 4th, " | 683,288 | " | " | 221,848 | " |
| " | 11th, " | 468,041 | " | " | 191,878 | " |
| " | 18th, " | 407,822 | " | " | 98,038 | " |
| " | 25th, " | 512,551 | " | " | 110,382 | " |
| May | 2d, " | 471,652 | " | " | 269,026 | " |
| " | 9th, " | 669,310 | " | " | 9,951 | " |
| " | 16th, " | 473,581 | " | " | 191,642 | " |
| " | 23d, " | 262,398 | " | " | 136,774 | " |
| " | 30th, " | 328,944 | " | " | 179,787 | " |
| June | 6th, " | 34,169 | " | " | 71,804 | " |
| " | 13th, " | 406,788 | " | " | 15,588 | " |
| " | 20th, " | 344,423 | " | " | 20,404 | " |
| " | 27th, " | 297,988 | " | " | 17,020 | " |
| July | 3d, " | 224,238 | " | " | 28,123 | " |
| | Total, 1863, | 11,448,086 gals. | | 1862, | 3,107,874 gals. | |

Showing an increase of 8,340,212 gals. in favor of 1863.

Oil Creek Railroad.—During the month of June the Oil Creek Railroad carried 52,857 barrels of petroleum.

Gas Lime as a Manure.—Judge Strong recently mentioned to the writer an instance of the successful employment of gas lime upon his farm in Suffolk county, on the northern shore of Long Island. The gas lime was purchased in a considerable quantity at a cost of five cents per bushel; as it lay in the heap and was scattered from it by the wind, the grass around seemed to derive no benefit whatever from the sprinkling although the casual scatterings from an ash heap under similar circumstances always show a marked effect. Hence little good was expected. This was several years ago. The lime was spread at the rate of one hundred bushels per acre on seeding down with wheat, timothy being sown in fall and clover in the spring. The wheat crop harvest showed no apparent result from the gas lime, but the first crop of grass was a remarkably good one, and for five successive seasons two tons of hay per acre were cut in the field, when, without the effect exerted by the lime, a ton and a half or thereabouts would have been anticipated as the average of *three years*, when the land would have to be broken up, thus giving only three average crops instead of five good ones. So much for the action of the gas lime upon the grass. The soil, it should be added, is a strong loam.—*Country Gentleman.*

Gas in England.—We learn from the London *Builder* that the Salisbury Gas Company intend reducing the price of their gas to 5*s.* 6*d.* per thousand cubic feet.

At Cuckfield, the company who last year reduced the price of their gas from 10*s.* to 8*s.* 4*d.* speak of another reduction. The former reduction appears to have brought a considerable surplus, which is left as a reserve fund, but does not yet suffice for a dividend. The directors, says the *Builder*, are therefore taking the right way to secure one in time to come.

At Kelso the gas company have declared a dividend of ten per cent.

At Wisbech the Gas Company is said to be in a very prosperous condition, and it is reported that the rate of dividend has been increased, while the price of gas has been reduced to 4*s.* 6*d.* per thousand cubic feet.

Robinet, a member of the [illegible] has published an account of experiments conducted by him to test the effects of congelation upon drinking-water. It is well known that the ice, which is formed in the sea, yields nothing but fresh water, all the salt having been eliminated by congelation. In the northern parts of Europe this property is turned to account for the extraction of salt from sea water; for a large sheet of the latter having been left to freeze, the ice is afterwards cut away, and the unfrozen water left below is so rich in salt as to require very little evaporation to yield it in a solid state. This property will also serve to analyze wine. Suppose it was required to determine the quantity of water fraudulently added to a certain wine: by exposing it to the action of artificial refrigeration, all the water would be alone, and the wine left in its purity. By a similar process, ships at sea, being short of water, might be supplied with this necessary article. We will suppose the temperature of sea-water under the tropics to be 30° centigrade. If a quantity be exposed in a vessel to the action of a mixture of sulphate of soda and hydrochloric acid, two very cheap commodities, the temperature of the water will fall to 10° below freezing point. Let it then be exposed to a second mixture of the same kind, generally eight parts of sulphate to five of the acid, and the temperature may be lowered to 17° below freezing point. Congealed water is then obtained free from salt, and may be used with impunity. Dr. Robinet has added a new fact to this theory, by showing that the water of springs and rivers loses all its salts by congelation. These salts are chiefly those of lime and magnesia. The water subjected to experiment was that of the lakes of the Bois de Boulogne, the ice of which was found to be entirely free from the above-mentioned salts. Such, indeed, is the chemical purity of the water thus obtained, that it may in most instances be substituted for distilled water.

Tin-lined Lead Cisterns and Pipes.—At a late meeting of the Liverpool Chemists' Association, specimens of lead pipe and sheet lead, electro plated with tin, were exhibited by Mr. Holt; and some discussion ensued respecting the use of lead coated in this manner for water-cisterns and pipes. It appeared to be the opinion of the meeting that a coating of tin, instead of preserving the lead, was far more likely to ensure its more rapid corrosion; for if the coating of tin by any means happened to be scratched off, even to the slightest extent, galvanic action would take place, and the lead would be destroyed very quickly. Dr. Nevins and Dr. Edwards stated that their experiments had proved that such would undoubtedly be the case: Dr. Edwards remarking that in one case which he had examined, a cistern made of lead, in which was an accidental admixture of tin, was eaten out by well-water in six months, the lead being rapidly precipitated in the form of sulphate, &c.

Making Gas in a Blast-Furnace.—As an improvement upon the ordinary mode of manufacturing gas, Dr. Jaques Arbos, of Barcelona, proposes the use of blast-furnaces, so arranged that the necessary charges of the material from which the gas is to be made can be introduced without the admission of external air, or the escape of the gases. The furnace itself is in the form of an inverted cone, a grating being provided near the bottom, below which the blast is introduced. At the top of the furnace there is a hopper, through which the fuel is supplied, and a bent tube with a syphon and funnel for the introduction of oil, petroleum, or other fatty or gas producing matters. The gas formed passes from the top of the furnace by a pipe to the receivers, whence it may be conducted, and applied to lighting and heating purposes. When applied to the production of motive power the gas is conducted from the furnace to an engine somewhat of the form of Lenoir's, and exploded by electricity in the same way.—*London Mining Journal.*

Hoboken, N. J.—The gas-works have been commenced at this place, and will be speedily pushed on to completion. They will have a good district to light, and the company's stock should command a firm value from the start.

Light.—Professor Wm. Allen Miller, F. R. S., recently delivered a lecture before the Royal Institution of Great Britain on the subject of recent spectrum discoveries. In the course of his lecture the professor showed that some kinds of light were without chemical action, the light from a mixed air-gas flame possessing scarcely any, while that from an ordinary gas flame did possess a little. The oxyhydrogen flame, while attended with intense heat, was endowed with very little chemical action.

Gas in Mauritius.—A company has been formed in London to light the island of Mauritius with gas. The capital stock of the company is to consist of £100,000. Port Louis, the capital of the island, has a population of about 75,000 inhabitants.

Colliery Explosion in England.—An explosion which caused severe injuries to seven men, one of whom has since died, recently occurred at the Brymbo Colliery, near Wrexham. It appears that a quantity of gas had collected in one of the workings, and the roof unexpectedly falling in, there was a rush of gas, which came in contact with a naked candle carried by one of the men, and an explosion ensued.

## PATENTS.

### UNITED STATES.

39,036.—James E. Cronk, Poughkeepsie, N. Y., for a Water Elevator. Ante-dated Jan. 10, 1863:

I claim the combination and arrangement of the shaft, J, loose roller, G, ratchet, N, or its equivalent, with sliding tube, M, substantially as described.

39,057.—J. C. Love, Pittsburgh, Pa., for a Furnace for burning Tar, Oil, &c., as Fuel:

I claim the use and combination of a series of long shallow troughs or trays with a box or heater used for supplying tar or oil to said troughs, through a series of pipes leading to the troughs or trays aforesaid, and placing said box or heater in such close proximity to the furnace as that the tar or oil shall become heated so as to generate gas before passing into the troughs or trays, for the purposes herein shown and set forth.

I also claim constructing the grate-bars and trays so that they may be reversed, for the purposes herein shown and set forth.

39,065.—Washburn Race, Lockport, N. Y., for a Pump:

I claim the combination of the grooved metallic, water-packing piston, B, and leather packing, a, or its equivalent, arranged in such a manner, that the metallic portion slides easily in the cylinder and forms the guide, while the leather portion produces a more perfect packing without being subject to great wear, substantially as herein set forth.

I also claim the groove or enlargement, I, in the pump, with the contracted opening, m, above, by which means the water is prevented from overflowing, and a greater pressure is produced in the spout, substantially as described.

39,079.—D. E. Teale, Norwich, N. Y., for a Water Elevator:

I claim, first, the catch or click, k, placed upon the pawl, F, and operated by the hook, e, and by the projection, p, placed upon the outer edge of the rim, G, as set forth.

Second, In combination with the cylinder, B, and cord or its equivalent, I claim the stops, s s, moving in the slots, r r, of the arms, A A, as and for the purposes set forth.

39,081.—H. E. Towle, New York City, for a Joint for Pipes:

I claim the combination of the flexible flange or flanges with an internal sleeve, substantially in the manner described and for the purpose specified.

39,101.—Jacob Miller (assignor to himself and Ernest Prussing), Chicago, Ill., for a Lamp. Ante-dated Feb. 14, 1863:

I claim, first, In combination with a wick-tube of any suitable form, a conical deflector with straight sides, of equal vertical length, converging at an angle of about forty-five degrees to the perpendicular and an aperture at top formed with sides parallel with the top of the wick-tube, all substantially as herein set forth.

Second, Supporting the said deflector adjustably upon the wick-tube by means of rods, j, projecting from a flanged and slotted tube, G, fitting upon the said wick-tube with a yielding pressure.

Third, The collar, I, jointed rod, J j, and clamp screws, j, employed in the manner described, to support a reflector, shade, or other article in any desired position.

39,102.—William Painter, Fallston, Md., assignor to Charles Painter, Owing's Mills, Md., for a Lamp Burner:

I claim, first, Having the side pieces, h h, and the ends, g g, constructed and arranged in reverse inclined positions, in the manner herein shown and described.

Second, The combination of the attachment above specified with the tubes, F A, the latter being screwed into the fountain or body, B, of the lamp, and enclosing the wick-adjusting wheels, b, as set forth.

39,129.—H. W. Dopp, Buffalo, N. Y., for a Coal-Oil Heater:

I claim, first, The adjustable small disk, a, in combination with the perforated distributing plate, A, for the purposes set forth.

Second, I claim the mode of vaporizing coal-oil of any gravity, or other hydrocarbon liquids for heating and cooking purposes, by means of a retort without wicking or packing of any kind or form, so arranged that the supply of oil enters into the retort below the point of vaporization as described.

Third, I claim the combination of retort, C, and draw-off valve, H, for the purpose described.

39,131.—Daniel A. Draper, East Cambridge, Mass., for a Spring Catch for Lamps:

I claim the construction of the spring catch, and its application or arrangement, relatively to the deflector holder and the wick-tube, the whole being substantially as above described.

39,153.—E. B. Larcher, New York City, for a Lamp Wick:

I claim for the wicks of lamps, the holder containing asbestus, substantially as described, in combination with common wicking extending down into the reservoir of the lamp, substantially as and for the purpose specified.

39,154.—A, B. Latta, Cincinnati, Ohio, for a Lamp:

First, I claim the connection of a common burner with the inverted metallic chimney, C, by means of solder, so as, when used with a single metallic cone, to make a conductor of heat from the flame to the air inside the chimney, thereby rarefying the air and producing an upward current therein.

Second, I also claim the combination of the inverted chimney, C, with the oil chamber, G, when used with a single metallic cone, so as to direct the current of air passing between the inverted chimney, C, and the oil chamber, G, against the flame on all sides, thereby sustaining the flame without the aid of a glass, chimney, or other appliances.

39,159.—Wm. Mills and O. H. Burdett, New Athens, Ohio, for Gas Apparatus for Domestic Use:

We claim, first, The arrangement of the concaves, E, or their equivalent, forming a zig-zag or winding passage in the interior of the purifier, constructed and operating in the manner and for the purpose substantially as described.

Second, The arrangement of a lime chamber in the movable lid, F, of the purifier in connection with the flexible tube, I, constructed and operating as and for the purposes set forth.

39,195.—Louis Bader (assignor to himself and C. F. Elwert), Philadelphia, Pa., for a Coal-oil Lamp:

I claim the burner composed of cases inclosing chambers, J K L and M, arranged in respect to each other and to the wick, and communicating with each other, substantially as described for the purpose specified.

### RE-ISSUES.

1,504.—W. H. Gwynne, White Plains, N. Y. Patented March 11, 1862. For an Apparatus for making Water-Gas:

I claim the distributing box, B, with its circulating and heating passage, D, and its perforated cover or top, C, the whole operating substantially as herein described and shown for the purpose set forth.

1,505.—W. H. Gwynne, White Plains, N. Y. Patented March 11, 1862. For a Process of making Water-Gas:

I claim the within described mode of obtaining a more uniform mixture of gases eliminated from coal and water, or their equivalents, in separate retorts, by supplying the hydrocarbon gas retort with gases eliminated from vapor of water in a separate retort by passing steam super-heated to about the temperature of the incandescent decomposing material in a finely divided state through the mass of said decomposing material, substantially as and for the purposes set forth.


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The second part is approaching completion and will shortly be announced.

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REPORT OF THE PROCEEDINGS OF BOTH HOUSES OF PARLIAMENT ON THE METROPOLITAN GAS BILL.

THE CHEMISTRY OF GAS-LIGHTING. By Lewis Thompson, Consulting Chemist.

A few copies of the above books, invaluable to gas engineers, are for sale at the Rooms of the AMERICAN GAS-LIGHT JOURNAL, No. 39 Nassau st., New York City.

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ALEX. BRANDON,
JAMES MURRAY,
RICHARD O'BRIEN. } Committee of Lamps and Gas.

THE COMMITTEE ON SEWERS of the Board of Aldermen will meet EVERY WEDNESDAY, at 2 o'clock P. M., in room No. 8, City Hall. Parties interested in any matter before the Committee will have an apportunity of being heard.

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CHARLES H. HALL,
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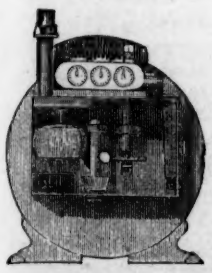

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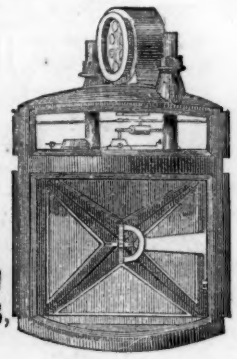

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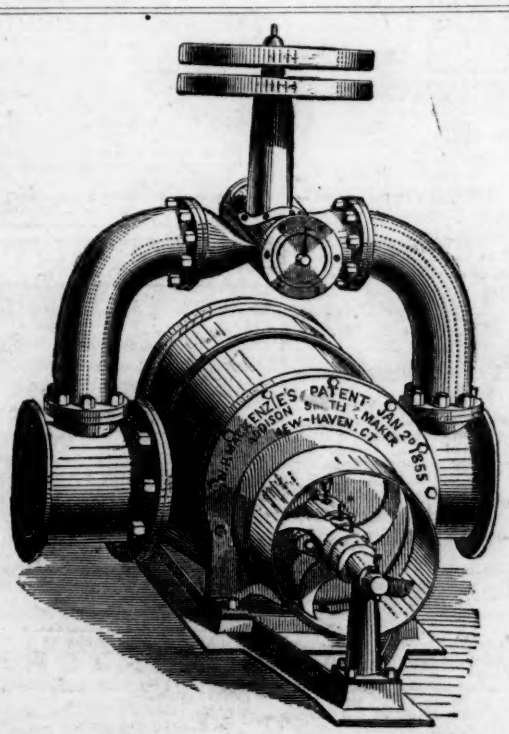


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